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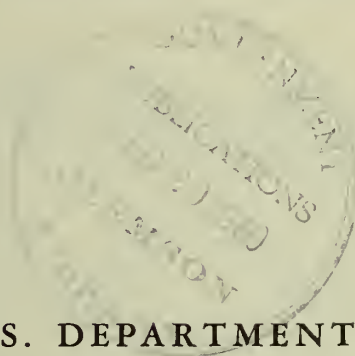
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THE HUBBARD SITE *AND OTHER TRI-WALL STRUCTURES IN NEW MEXICO AND COLORADO*



NATIONAL PARK SERVICE • U.S. DEPARTMENT OF THE INTERIOR



FEDERAL
PUBLICATION

THIS PUBLICATION is one of a series of research studies devoted to specialized topics which have been explored in connection with the various areas in the National Park System. It is printed at the Government Printing Office and may be purchased from the Superintendent of Documents, Government Printing Office, Washington, D.C. Price \$1.00 (paper cover).



UNITED STATES DEPARTMENT OF THE INTERIOR
Fred A. Seaton, *Secretary*
NATIONAL PARK SERVICE
Conrad L. Wirth, *Director*

The Hubbard Site
and Other Tri-Wall Structures
in
NEW MEXICO AND COLORADO

BY R. GORDON VIVIAN



Archeological Research Series Number Five

NATIONAL PARK SERVICE • U.S. DEPARTMENT OF THE INTERIOR • WASHINGTON 1959

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Foreword

Aztec Ruins and Chaco Canyon National Monuments, as well as other southwestern archeological sites, contain peculiar tri-wall structures, the use of which by the prehistoric Indians of this area has long been a mystery. In 1953, R. Gordon Vivian, archeologist of the National Park Service, directed excavation of the Hubbard Mound at Aztec Ruins National Monument. His careful and detailed work laid bare one of these tri-wall structures.

From his analysis of multi-walled structures at the Hubbard Site and at other sites in New Mexico and Colorado, the author has formulated a significant hypothesis. Much more testing will be necessary to fully develop this hypothesis; but, meanwhile, it opens an interesting new pathway into the darkness obscuring our knowledge of America's ancient past.

With pleasure I commend to professionals and interested laymen alike this fifth report in the Archeological Research Series of the National Park Service.

Conrad L Wirth

Director

Acknowledgments

I am first of all indebted to my superiors in the National Park Service, John M. Davis, Erik K. Reed and Charlie R. Steen. They made it possible for me to undertake both of the excavations reported; and they permitted me time from other duties in which to write them. In many ways they also furnished constant help and encouragement.

To my two coworkers in the field, Leland Abel and Tom Mathews, I owe especial thanks. They supervised much of the actual fieldwork, and a good part of this report is based on their careful notes and observations. I cannot itemize the many ways in which they made this report possible; it is theirs as much as it is mine. I would only note here that Tom, a good companion, froze with me through an Aztec December while keeping notes on the stratigraphic sections, and that Leland Abel furnished the excellent photographs of the Pueblo del Arroyo site.

I also wish to thank Roland Richert for unpublished material on stick-and-mud construction at the West Ruin, Aztec, and for data and photographs on Mound F at Aztec Ruins.

Particular thanks are due to Bryant Bannister, curator of the Tree Ring Laboratory, University of Arizona (Tucson), for taking time out to work on material from Pueblo del Arroyo and for furnishing the provenience of all previous dates from that site.

Stanley Stubbs of the Laboratory of Anthropology, Museum of New Mexico (Santa Fe), whose help and advice have graced many reports from the Anasazi area, kindly checked the identification of trade wares from the Chacra Mesa.

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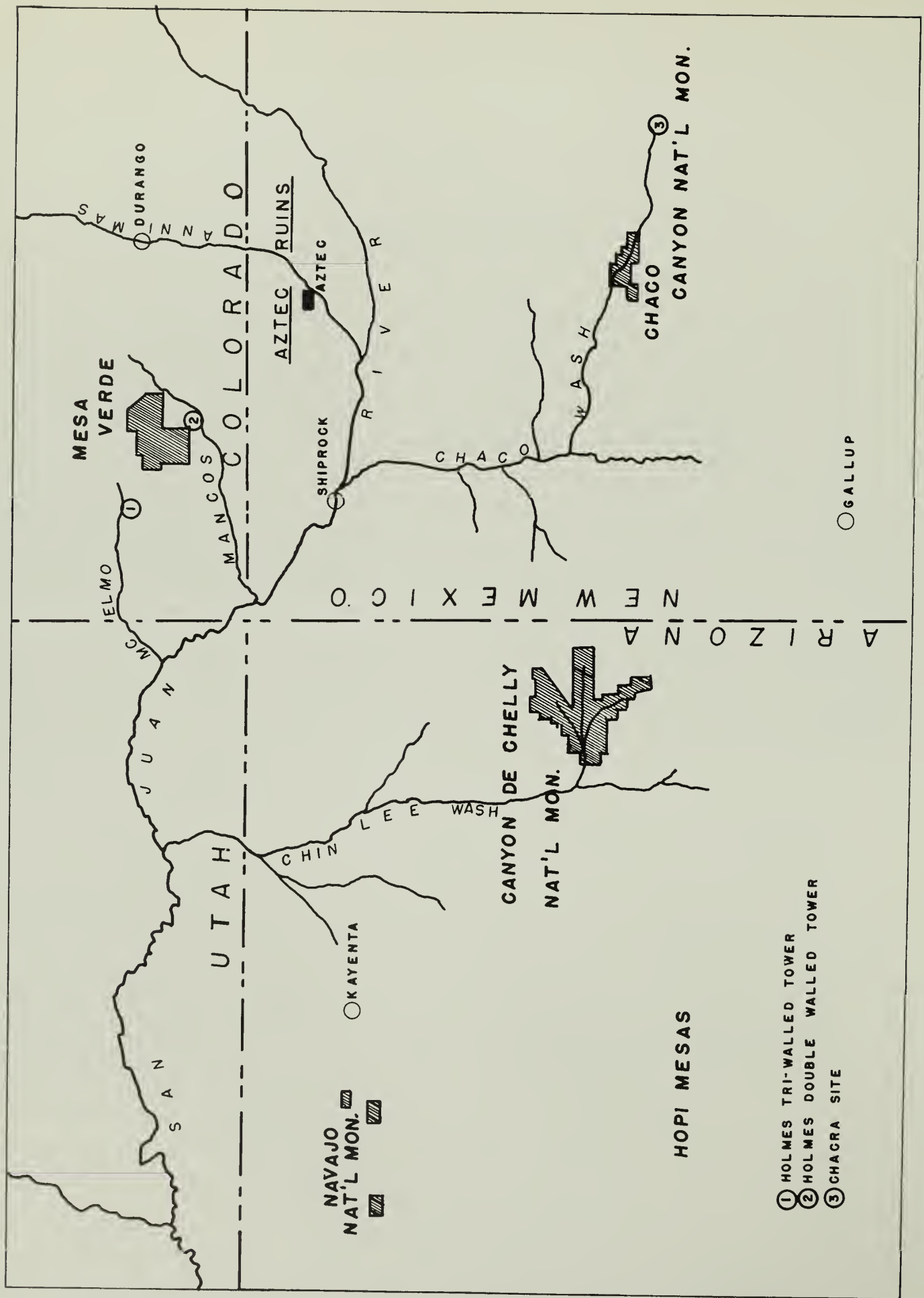


FIGURE 1. The Four Corners area, showing the locations of other multi-walled structures.

Introduction

This report is an example of how unplanned archeological studies grow. There is, spread across the Anasazi area, from McElmo Wash on the west to the Chacra Mesa on the east, a line of circular, double- or triple-walled structures which are unique in the Southwest (Fig. 1). They are late in the prehistoric occupation of this area and represent, in the light of present knowledge, the last surge of building activity in the areas where they are found. The first of these structures was described in 1878. Despite their unusual character, or perhaps because they seemed an aberrant form, no excavations were undertaken in such a site until 1926 when one in Chaco Canyon was partially excavated. Unfortunately this has never been published nor are the manuscript or plans available for examination.

In 1950, as part of the stabilization program of the National Park Service, the writer and Leland Abel undertook the stabilization of the triple-walled structure at Pueblo del Arroyo, the Chaco Canyon site which had been partly excavated in 1926. This field work was finished in the summer of that year and a report on the structure was submitted in January 1951. At that time it was proposed to publish this report in the Southwestern Monuments Association Series, together with another report completed some years earlier on the salvage excavation of an early Pueblo II site in Chaco. This scheme was delayed.

In 1953, in an effort to fill gaps in the interpretive story at Aztec Ruins, the National Park Service began excavation of the Hubbard Site, a triple-walled structure there. T. B. Onstott was in charge of this excavation. It was not carried to completion and Onstott subsequently resigned from the Service. From October into December of the same year, the writer and Tom Mathews completed this excavation and began stabilization of the site for interpretive use, a task that was completed in more equable temperatures the following summer.

When I began to work up this Hubbard material a year or two later, the report on the del Arroyo Tri-wall was still unpublished and it was decided to combine these two into one report. Consequently, much of the data on Chaco pottery was extracted from the del Arroyo report and reworked for inclusion in a single pottery section.

In the meantime the writer and others had found a ruin on the Chacra Mesa, with some walls still 8 feet high, which appeared to be similar in many respects to other double- and triple-walled structures. It was later mapped, photographed, a sherd collection made, and the data compiled for this report.

Thus what began innocently enough as a small stabilization project has grown by accretion into the present report.

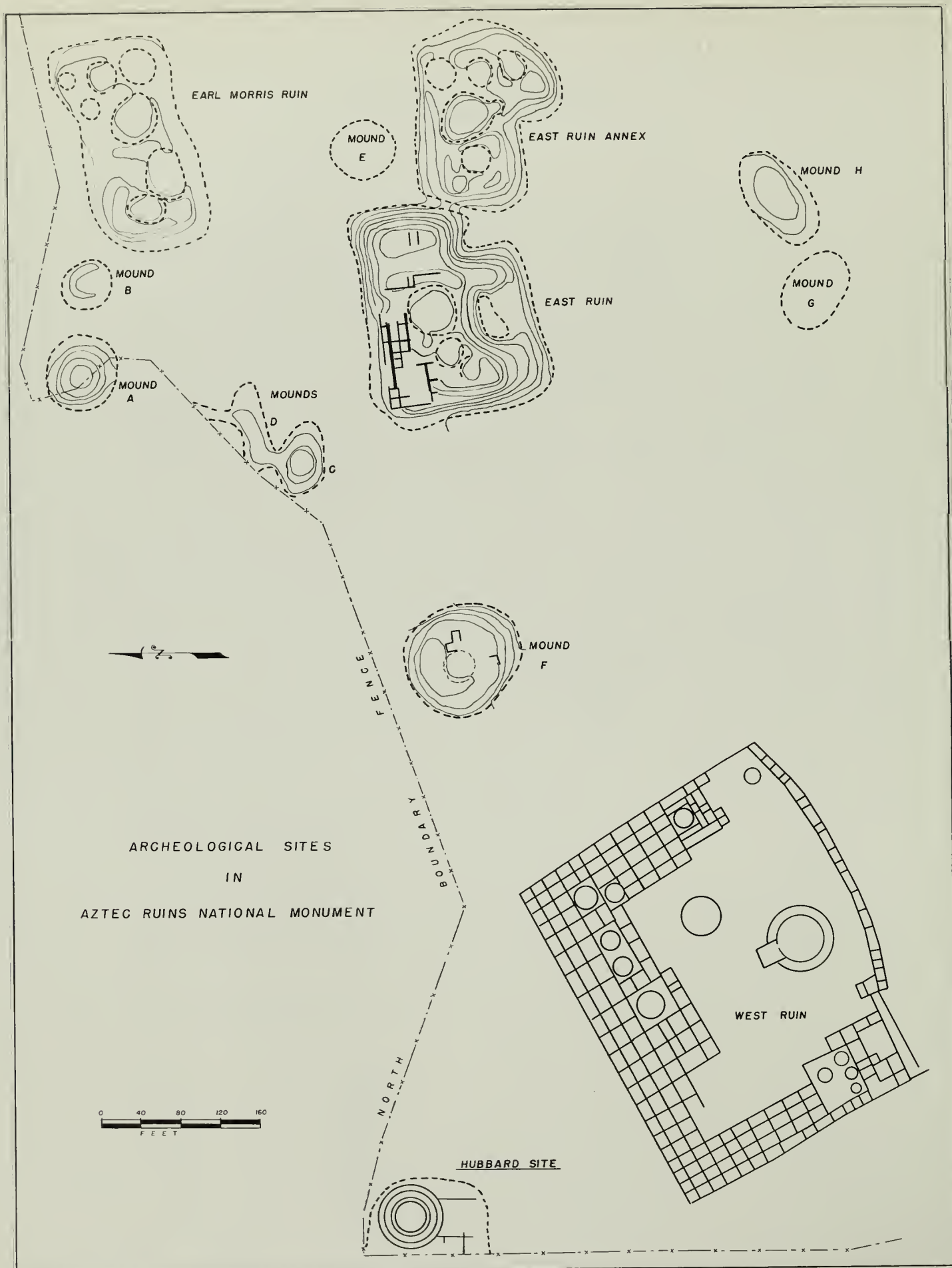


FIGURE 2. Archeological sites in Aztec Ruins National Monument.

The Hubbard Site

CULTURAL AFFILIATIONS

The Hubbard Site is part of Aztec Ruins National Monument (Fig. 2), a group of ruins situated on the west side of the Animas Valley about a mile northwest of the town of Aztec, N. Mex. This is a striking concentration of major archaeological remains in a small area; the monument also includes the West Ruin, a large multi-storied Pueblo III structure excavated by the American Museum of Natural History between 1916 and 1921 (Morris, 1919, 1921, 1924, 1928); the largely unexcavated East Ruin and its Annex, which are also large Pueblo III structures; a smaller Pueblo known as the Earl Morris Ruin; and eight additional mounds of varying size and importance which are lettered A to H. Of these last, Mound F, a circular structure, was trenched by Onstott while conducting part of the work described here.

While the most impressive sites are those within the monument, the Animas Valley also contains numerous other remains. In the immediate vicinity of the monument, several have been largely obliterated through farming operations; and south of the town of Aztec one very large cobblestone site of late date has been destroyed in diverting the river. To the north in Colorado, in the Animas drainage, are Morris' important Basketmaker II sites (Morris, 1954). The drainage north of the State line is particularly rich in Basketmaker and early Pueblo remains and the region around Durango was the subject of a Gila Pueblo archeological survey conducted by I. Flora (Morris, 1954: 1). It seems probable that, were such a survey continued southward to the juncture of the Animas and San Juan, it would show a continuum of sites from Basketmaker II to the large structures of late Pueblo III.

The Animas Valley is on the eastern periphery between the Chaco and Mesa Verde centers of the San Juan Anasazi. Its development period, unlike that of the La Plata to the west, has received almost no attention; but its later phases, as exposed in the large West Ruin, have been interpreted in terms of influence or colonists from the Chaco and Mesa Verde centers (Morris, 1919, 1921, 1924, 1928). A paper on tri-walled structures, a very late manifestation, is perhaps not the place to review the development of the Chaco and Mesa Verde branches of the San Juan Anasazi. On the other hand, Reed (1946) has cast some doubt on the separate identities of these two branches. He prefers to see a continuity of culture and population in the northern Southwest from Basketmakers to the modern Rio Grande Pueblos. In so doing he considers Chaco and Mesa Verde not as branches but as successive periods over the same general area, a Chacoan influence being predominant to about A.D. 1150 throughout the general San Juan region, with a Mesa Verde

period following. Admittedly, the Chaco and Mesa Verde branches, as parts of the San Juan Anasazi group, are more like each other than either of them is like the Kayenta branch. The demonstrable differences between them are so far confined to variations in ceramics and architecture, and in one period perhaps burial practices. In any overall discussion as regards the Anasazi in comparison with other groups, these variations tend to become inconsequential and to disappear. However, Morris' works on Aztec refer to the Chaco and Mesa Verde as separate entities which followed each other there. O'Bryan (1950), following the Gladwin system, regards the Mesa Verde as a branch, as does Gladwin (1945) for Chaco. While admitting a broad general applicability of Reed's arguments, it also would appear that in considering the life history of a single site the variations found there between different branches do take on some meaning.

While we see a general, basic "eastern Basket Maker III" culture as obtaining over the entire Mesa Verde/Chaco region as far east as the Puerco of the north and perhaps into the Rio Grande, we also note an early divergence in the painted pottery—iron oxide paints as against organic paints. Paint types in the Chaco from Basketmaker III sites, Half House (Adams, 1951: 279) and Shabikeshchee Village, (Shepard, in O'Bryan, 1950: 90) are iron oxide of the La Plata/White Mound style. Basketmaker decorated pottery of the northern La Plata and Mesa Verde carries predominantly organic paint in Lino style (Shepard, 1939: 267; Lancaster and Watson, 1945:195). The earliest pithouses of the Mesa Verde area antedate somewhat the two published examples from the Chaco. The Chaco material is also extremely limited. A brief comparison of Half House (Adams, 1951: 285-289) and Shabikeshchee (Roberts, 1929) with O'Bryan's Chapin Mesa Phase (1950: 105) and the pithouses excavated by Lancaster and Watson (1943) shows them to be practically identical.

Differentiation in architecture becomes noticeable with the advent of contiguous surface rooms and the development of definite kiva structures. Compare Kiva 1 at the Three-C Site (Vivian, no date,) and its low, wide bench, lack of pilasters, subfloor vent shaft, and slab deflector (all characteristics of the later Chaco kiva) with O'Bryan's Mancos Mesa Phase kivas with pilasters, above floor vent openings, and masonry deflectors (Vivian, 34, 108). Ceramics from this point forward continue to diversify, developing into well recognized regional styles.

The present writer believes that from perhaps A.D. 950 or earlier the branches had separate identities when compared with each other, and that these identities were so well ingrained that colonists into either area maintained their separate forms of architecture, kiva style, and possibly ceramic practices. While this facet of their intertwined his-

tories has received little attention in the Mesa Verde, some of the six excavated "Bc" Sites in Chaco, only two of which are published (Brand *et al.*, 1937; Kluckhohn and Reiter, 1939), as well as the buildings adjacent to the Tri-wall at del Arroyo, do appear to be the products of colonists from the Mesa Verde/San Juan area. These sites lack cored masonry, they contain Mesa Verde-style kivas, they are composed of small tight clusters of rooms as opposed to the plaza style of Chaco architecture. Tree-ring dates of 922+ through A.D. 1077 to 1110 demonstrate that they were contemporaneous with the large Chaco pueblos of Bonito and Chetro Kettle (Hawley, 1937: 81; Kluckhohn, 1939: 43; Bannister, personal communication). Until the pottery of the remaining four sites and Bonito is published, the statement that there was possibly a difference in the pottery complexes, in degree rather than in kind, will have to remain at the level of a personal opinion.

DESCRIPTION OF THE SITE

The extant part of the Hubbard Site is located in the extreme northwest corner of Aztec Ruins National Monument. The latest structure on the site, the massive Tri-wall, lies within 30 feet of the north boundary and within 4 feet of the west boundary and a road. Earlier levels of the site underlay the road and, from the relative elevations, it seems

probable that they extended still further into what is now a cultivated field. Levels contemporaneous with the Tri-wall appear to have been removed in construction of the road. Thus, what is reported here covers but a small part of the lower levels and a correspondingly greater proportion of later occupation. Previous to excavation, the site was a mound rising some 8 feet above the cultivated fields and the road (Fig. 3). Its north-south extent was approximately 120 feet; east to west, where it was reduced by the road, it was 60 to 70 feet across. The mound bore an extremely heavy cover of brush. Further, it had been dug into in at least three places, and the original walls, 5 to 6 feet high, had been reroofed and the rooms used as root cellars. An irrigation ditch and an orchard on the edge of the southeast curve of the mound had destroyed the stratigraphy in this area.

Excavation of the Hubbard Site was undertaken by the Region Three Office of the National Park Service with T. B. Onstott in charge. Work began June 8 and terminated July 24, 1953. Onstott cleared the triple-walled structure and two rooms of an underlying level but he did not have time to investigate the remainder of the mound continuing south from the Tri-wall (Fig. 4). Onstott subsequently resigned from the Service and the data presented here on the triple-walled structure is compiled from his brief notes and from personal observations at the site. Following Onstott's work



FIGURE 3. The Hubbard Mound before excavation, looking north. The site, in an area of tilled land, was enclosed on three sides by the remains of an orchard and was covered with a dense growth of brush.

the writer, assisted by Tom Mathews, undertook the stabilization of the site to prepare it for monument interpretive use. This work began in October 1953 and continued into December of that year. The remaining part of the mound was found to consist primarily of refuse deposits and occupational surfaces which had grown through accretion. One kiva, portions of rooms and walls, as well as numerous bell-shaped pits were also uncovered in this southward extension of the mound. Drainage work inside the Tri-wall disclosed lower floor levels and another kiva. It is from this stabilization work of October to December, 1953, that the bulk of this report on the Hubbard Site is taken.

GROSS STRATIGRAPHY

The structures and refuse of the Hubbard Site lie within the Animas Valley proper but at the lower edge of an alluvial fan extending out from the drainage of a high terrace north of the site. This drainage still flows during periods of heavy rainfall, flooding the fields both north and east of the ruin and the area between the Hubbard Site and the West Ruin, the large excavated pueblo. The area between the Hubbard Site and the West Ruin, a distance of some 200 feet, has filled to a depth of 5 to 7 feet from this wash since abandonment. The lower trash deposits of the Hubbard mound dip sharply to the south, and at a little distance from the walls are covered with this detritus.

The following brief outline of the gross stratigraphy of the Hubbard Site is presented here as an aid to separating

its various components in the following descriptive sections. As the various levels were exposed in the field they were plotted on stratigraphic sections but referred to by their most obvious characteristics. Now that the material from these levels has been studied, there is a strong temptation to begin referring to them by phase designations at this point. The reader, however, may question the validity of our designations by the time he reaches the discussion; rather than hinder his thinking by constant repetition, the use of phase or branch names has been deferred and the descriptive sections employ the more cumbersome descriptive names.

The gross stratigraphy of the Hubbard Site from the lowest levels upward was found to be as follows:

1. The upper limits of the alluvial fan upon which the structures and refuse lie are of coarse sand and clay. It is pinkish-buff in color. Where this deposit was trenched near its southern limits, it showed in cross section layers and lenses of water-deposited pebbles and small gravel. Where the alluvial fan was exposed at a greater depth, below the central kiva of the Tri-wall, it was found to be entirely coarse gravel and cobblestones.

2. Upon the surface of this fan and rather near its south edge, a group of rooms of adobe construction was first erected. Adjoining the rooms on the southeast a kiva, also of adobe construction, was sunk into the alluvium with its floor some 6 to 7 feet below the level of the rooms. In a later period another kiva was sunk just northwest of the first kiva, and it seems most probable that this later kiva, and possibly some of the Tri-wall construction, caused the destruction of



FIGURE 4. The Hubbard Site at the end of the July 1953 excavation. The center of the mound had been cleared but the refuse deposits and the structures subsequently found in the foreground area had not been excavated.

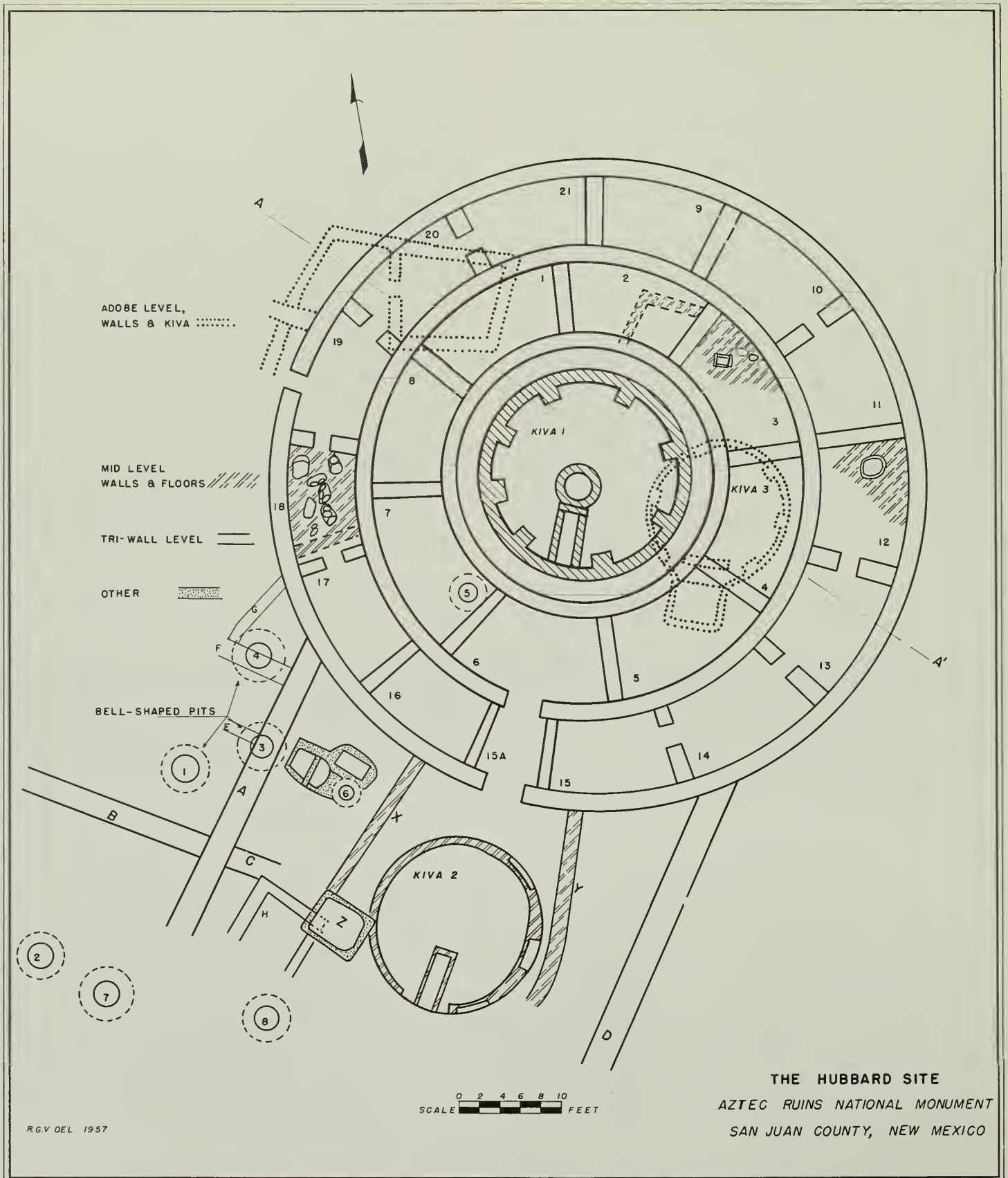


FIGURE 5. Ground plan of the Hubbard Site.

several of the adobe rooms. At any rate only portions of three rooms now remain within the mound and were cleared, though others can be traced continuing to the west beneath the present roadway. We have referred to these rooms and the kiva as the Adobe Level.

3. The time interval between the Adobe Level and the following one is not clear from the architectural remains, since they are rather crowded together below a third period of construction, the massive triple-walled building. At any rate, over the remains of the adobe rooms and the filled kiva there were erected another series of rooms and, to the south of them, another kiva. This construction was in tabular sandstone masonry. Very little remains of this second or middle period of construction since, whatever else befell these structures from natural causes, they were filled to a depth of at least 1 foot with sand and finally leveled off at a uniform height of 1.1 feet to make room for the third or triple-walled period of building. The Middle Level is represented by the bases of several walls, by floor surfaces and floor features, and by a partly dismantled kiva. It appears that this was a rather extensive occupation, considerably larger than its meager architectural remains would suggest. The refuse deposits and occupational surface attributed to it south of the Tri-wall are extensive, and the bell-shaped pits which developed during this period are also numerous.

4. Following the Middle Level occupation there was an interval of abandonment, during which at least a foot of sand washed into the rooms and spread somewhat more thinly over the accumulated refuse. This is the sterile layer, Layer D, of the refuse sections and it possibly marks the same period of abandonment noted by Morris in the West Ruin.

Following this interval was a thin deposit of sandy clay 0.1 to 0.3 foot thick, confined primarily to the refuse mound and Kiva 2, which effectively sealed them off from later deposits. The clay of this "seal layer" might have been derived from the walls of the Middle Level construction, but more probably it was connected with the construction noted below.

5. The last demonstrable construction at the Hubbard Site was the erection of the triple-walled structure and its related radial walls and central kiva, the Tri-wall Level. This con-

struction, directly over that preceding, required the razing of what remained of the Middle Level house walls except for the lower foot which was embedded in sand. Part of the Middle Level walls and floors, and probably part of the Adobe Level rooms, were removed completely in sinking the Tri-wall central kiva.

This completes the observable construction history at the Hubbard Site. At its climax it was dominated by the massive triple-walled structure some 60 feet in diameter. Lying outward from this were radial walls extending to the south and southwest, and to the west in the area now occupied by road and fields were presumably, in the fashion of other Tri-wall groups, a cluster of house rooms and kivas. One aspect remains unaccounted for in this gross stratigraphy. When the mound was first cleared of brush there were many large cobblestones on the surface above the Tri-wall and they extended to the apex of the mound. There were no cobblestone walls in the Tri-wall, however, there were cobblestone radial walls to the south. Considerable refuse was found among these radial walls and also some refuse within the Tri-wall rooms. Onstott noted two child burials in fallen roof material in Tri-wall Room 16. Thus these cobblestones above sandstone masonry, the late refuse among the radial walls, and the burials in fallen roof material, may represent a last short period which we cannot account for architecturally.

ARCHITECTURAL FEATURES OF THE THREE LEVELS

Adobe Level

Adobe Rooms (plan and profile, Figs. 5 & 6).—Parts of three rooms were exposed at the edge of the triple-walled structure. Additional rooms continued to the west under the road. Floor levels of the rooms were 2.7 feet below the Tri-wall floors. The indicated size of the rooms was 7 by 9 feet. The thick, well-defined clay floors sloped up sharply to meet the wall surfaces. Wall widths averaged 0.9 foot; construction was of adobe with an occasional embedded cobblestone, particularly near the base. The adobe was laid up in "lifts"

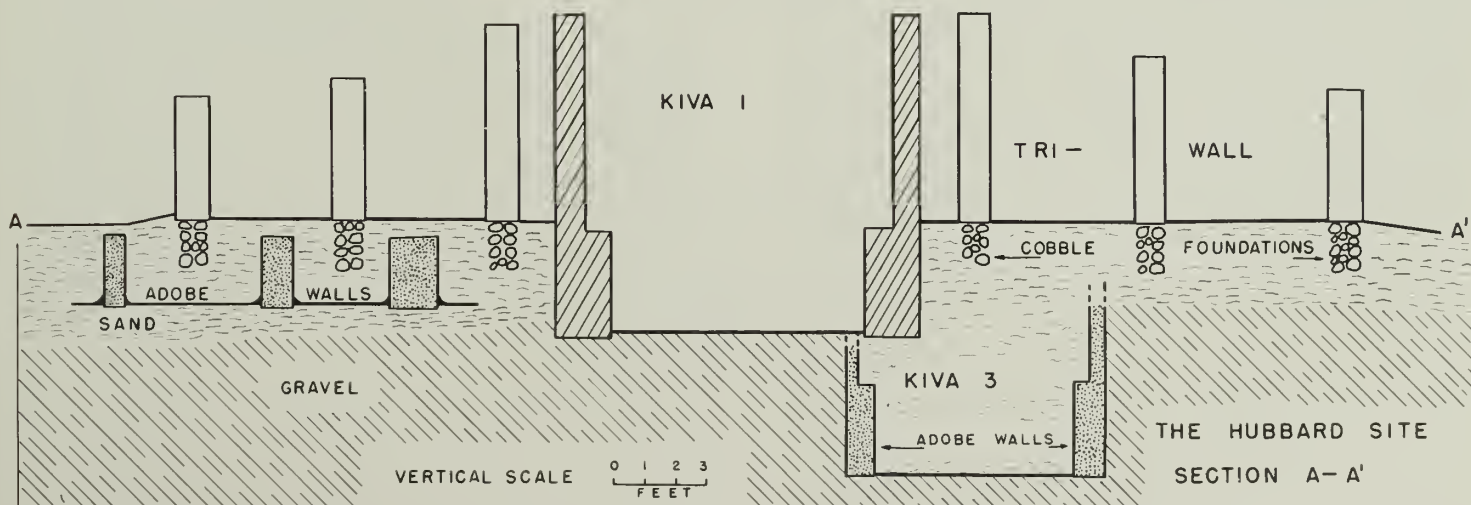


FIGURE 6. Northwest-southeast section through the Hubbard Site.

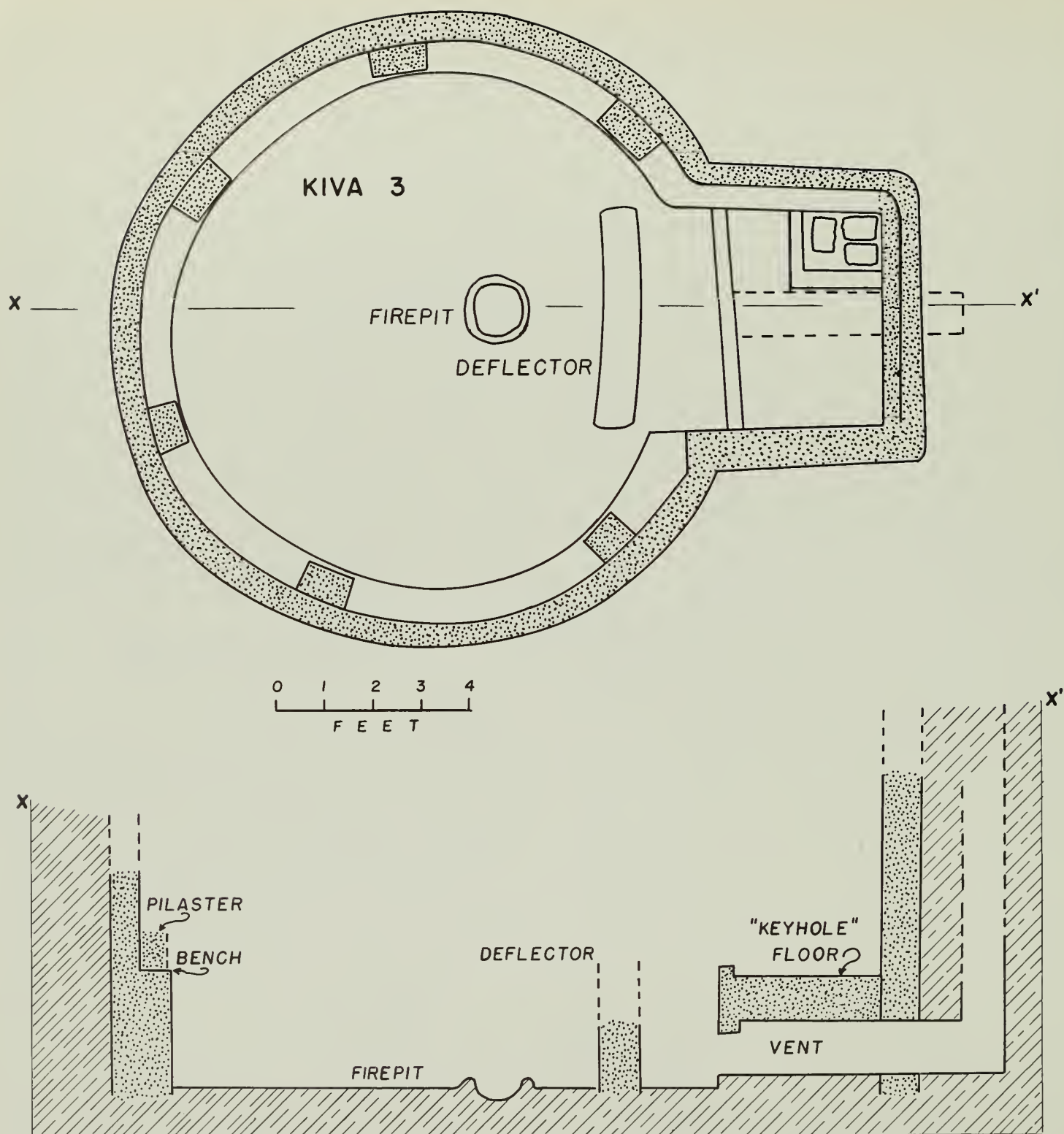


FIGURE 7. Plan and profile of Kiva 3 below Tri-wall Rooms 4 and 5. Construction is adobe reinforced with small rods or limbs.

while in a plastic condition and these lifts somewhat resemble turtleback construction. However, the lifts are continuous and not small individual increments as are turtlebacks. The lifts are 0.4 to 0.5 foot thick and the top of each is slightly convex in cross section. They show blurred hand prints and drying cracks. There was a fair bond between lifts: As each was laid the sides were smeared into the wall below and sufficient additional clay was applied to present a smooth surface. For this reason the wall looks like poured or formed construction and the individual lifts can only be determined in cross section.

DOORWAY: One small horseshollar-shaped doorway was immediately above the floor level.

FEATURES: No other wall or floor features were exposed.

Kiva 3 (plan, Fig. 7).—Kiva 3 is under the east side of the Tri-wall, the floor 8.5 feet below the Tri-wall floor and 4.6 feet below the floor of Kiva 1 (Fig. 6). It is of a general Mesa Verde or San Juan type with a keyhole-shaped recess and six pilasters. Greatest diameter above the bench is 12 feet. The bench width is 0.8 foot, the bench height 2.4 to 2.7 feet. The 6 pilasters average 0.6 foot wide and 1.2 feet long. The "keyhole" recess at the south is 4.5 feet wide and 5 feet deep. The remaining wall height of the circular wall is 4 to 5 feet with a maximum height remaining of 6.5 feet at the back of the keyhole. The floor of the south recess is raised to the same general height as the bench, 2.5 feet, and there is a raised rim 0.2 foot high along the face of the keyhole. At the back of the recess floor, in the southeast corner, there are small smooth stone slabs set together, and these are separated from the rest of the recess floor by a low clay rim. The ventilator shaft opens in the center of the lower face of the south recess, a roughly semicircular opening 0.9 foot high.

DEFLECTOR: Of adobe construction, slightly curved, it almost completely filled the front of the keyhole recess; the length is 4.6 feet, width 0.9 foot, and the remaining height 1.3 feet.

FIREPIT: This is a shallow, basin-shaped pit with a low clay rim.

SIPAPU: None was located.

CONSTRUCTION (Fig. 8): The walls and bench are of adobe reinforced with finger-sized rods, apparently small branches. All were badly decayed. These small rods were abundant and were laid both vertically and horizontally. The walls were thin, 0.6 foot. A cross section taken of the kiva wall indicated that the original excavation had been dug into the sand and gravel deposit, and the sides of the excavation then plastered with the combination of adobe and small rods until sufficient thickness had been obtained to form a wall. This same type of adobe-and-rod construction is found in the south row of rooms at the West Ruin, a few hundred yards away (see Morris, 1928: 276–281, Figs. 2 and 3 and footnote; see also Richert, 1953: 3–6 for further description and illustration of this construction in the West Ruin).

FILL: The kiva fill was entirely of sand. The 8.5-foot depth of fill in vertical section in the east half was recorded as: 0.0 to 2 feet, sand with occasional scattered crumbs of charcoal; 2 to 3 feet, a thin, charcoal flecked lens, prob-

ably redeposition, with occasional sherds. There was a burial at 2.5 feet; no pottery or other grave furniture accompanied it. This burial had been made through the floor of the Tri-wall, and the few sherds in the general area may have come either from this disturbance or from construction of the Tri-wall foundations. From 3 to 3.6 feet were washed layers of coarse sand and small gravel. At 3.6 feet there was another burial without accompanying offerings. From 3.6 to 8.5 feet there was fine alluvial sand with occasional crumbs of charcoal. The appearance is of the sand having washed across a burned area or firepit. The charcoal was not deposited directly in the kiva depression. A third burial also without offerings occurred at 5.5 feet. It is also noteworthy that the fill contained no indications of roofing or casts of roofing material.

The remaining height of the adobe kiva walls and the character of the fill, without refuse accumulations, indicate rapid filling of the kiva. From these adobe structures themselves we have few data to reach a satisfactory estimate of their age. Morris (1939: 53) noted adobe construction in the latest walls of a late Pueblo III building at Site 39 on the La Plata.

PAINTED POTTERY: The floor sherds, if any, from Onstott's excavation of the rooms are not available. There were no floor sherds in the above kiva. Our only sherd evidence here comes from high in the alluvial fill—material that was either washed in near the top or was incorporated in the fill as the result of the upper burial or construction of the Tri-wall foundations. The sherds from the upper 2.5 feet of the fill were:

<i>Sherd type</i>	<i>Number</i>	<i>Percent</i>
Mesa Verde Black-on-white.....	79	76
McElmo Black-on-white.....	15	14
Mancos Black-on-white.....	4	4
Puerco Black-on-red.....	5	5
Total.....	103	99

While deferring correlation of the structures with levels in the refuse sections, I suggest, solely on the basis of the rapid alluvial fill, that Kiva 3 remained roofed and perhaps in use after the adobe rooms were abandoned, and that the roofing remained intact until sometime toward the end of the following (Middle Level) period of occupation. On its final abandonment, then, the timbers were salvaged and the filling was very rapid. The last 3.6 feet, from the layer of small gravel upward, can be attributed to the wash which spread over the entire site during an interval of abandonment between the Middle Level and Tri-wall Level periods.

Middle Level

A Middle Level occupation on the Hubbard Site is represented below the Tri-wall by four floor surfaces, three of them with floor features, and by fragments of walls from two rooms (Fig. 9). South of the Tri-wall, in the area of the radial walls, this level is represented by one kiva, an elaborate firepit complex, a large rectangular firepit and, both under the Tri-wall and in the refuse sections to the

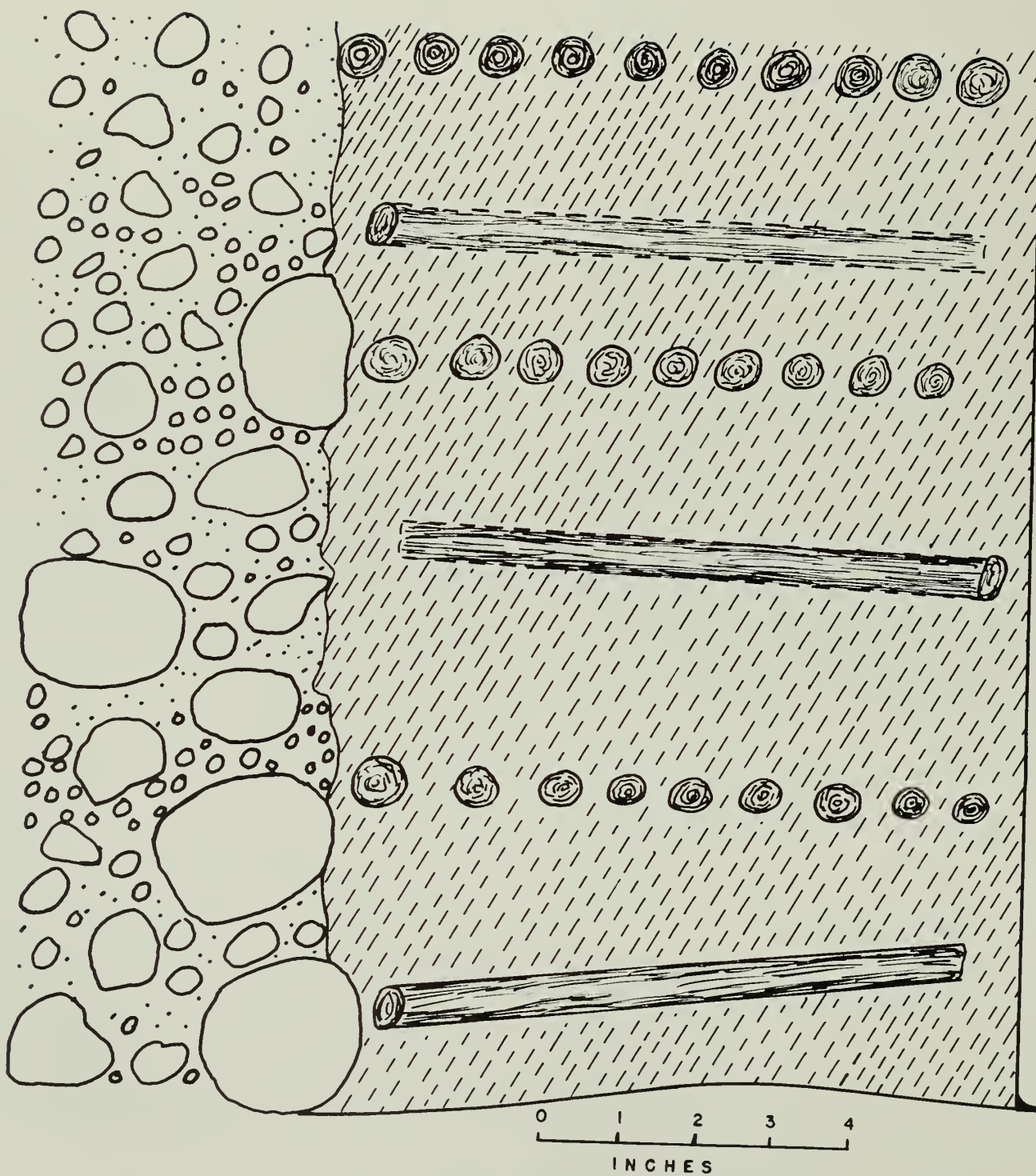


FIGURE 8. Rod-reinforced adobe construction in Kiva 3.



FIGURE 9. Middle Level construction below Room 2. Upper arrows show floor line of Tri-wall Level. Lower arrow (2) indicates the Middle Level floor. This level of construction was largely obliterated in the erection of the Tri-wall structure.

south, by seven deep bell-shaped pits. Of uncertain age but in the same general level were three very small bell-shaped pits.

Rooms.—Floors of this middle period were encountered below Rooms 2, 3, 12, and 18 of the Tri-wall structure. Their distribution indicates that they once extended across the area now occupied by the central kiva of this structure, and that in this central area they were completely removed during its construction.

The cobblestone foundations for the circular walls of the Tri-wall extend to a depth of 1.7 feet below the floor of the Tri-wall. The partition walls of this same structure are not so deep and extend an average of 0.8 foot below the upper floors. The Middle Level floors and their features described here run from between 1 to 1.3 feet below the level of the Tri-wall floors. Thus the excavations for the heavy cobblestone foundations of the circular walls, to a depth of 1.7 feet, have completely removed, wherever they crossed them, any traces of the Middle Level floors and walls. On the other hand the partition walls of the Tri-wall extending to only 0.8 foot did not completely obliterate Middle Level construction.

FIREPIT: One firepit was exposed; circular, clay lined and 1.2 feet in diameter.

FLAGGED DEPRESSIONS: There are three of these together in Room 3 and two together in Room 18. They are shallow depressions in the surface of the floor 1 to 1.5 feet wide and 1.5 to 1.8 feet in length. The rims which come only slightly above floor level are of large pebbles set in abundant clay. The bottoms of these depressions are floored with flat, smooth slabs. The three depressions in Room 3 are joined on their long axes and one was partly cut through by a partition wall. The two in Room 18 are also joined on their long axes. They show no evidence of fire and it is possible that they were basins to catch meal from metates set on the floor surface.

WALLS: One room corner was preserved under Tri-wall Room 2 and one wall section under Room 18. The bases of the walls were cobblestones to a height of 0.6 foot; above this, construction is coursed sandstone blocks. Widths range from 0.9 to 1.1 feet. The tops of the walls were rather uniformly leveled off at 1.1 feet, the level of the Tri-wall floors.

ARTIFACTS: Room 2 was barren; from Room 3 were recovered two intact and two fragmentary manos. In Room 18 were one ax, fragments of several culinary ollas, and one corrugated culinary olla set below floor level.

FILL: The space between the Tri-wall Level and Middle Level floors is 1 to 1.3 feet. There was no fallen wall material in this space. It is filled with sand which blew or washed in. There were no casts of roofing. The sand fill showed scattered crumbs of charcoal but there was no burning and this charcoal seems to have been washed in rather than deposited where found. The supposition is that the Middle Level walls did not fall but were salvaged sometime after the rooms had filled with sand.

POTTERY: Sherds recovered from the fill between the two floor levels are shown below. Due to the thin nature of the fill, and the fact that it was everywhere disturbed by the later foundations, the sherds would seem to reflect conditions at the time of this later construction.

Room 4—subfloor fill

<i>Sherd type</i>	<i>Number</i>	<i>Percent</i>
Mesa Verde Black-on-white.....	58	64
McElmo Black-on-white.....	18	20
Chaco hachured.....	1	1
Mancos Black-on-white.....	11	12
Wingate Black-on-red.....	1	1
Tusayan Black-on-red.....	1	1
Total.....	90	99

Room 3—subfloor fill

<i>Sherd type</i>	<i>Number</i>	<i>Percent</i>
Mesa Verde Black-on-white.....	25	34
McElmo Black-on-white.....	26	34
Chaco hachured.....	1	1
Mancos Black-on-white.....	18	24
Wingate Black-on-red.....	5	6
Total.....	75	99

Room 9—subfloor fill

<i>Sherd type</i>	<i>Number</i>	<i>Percent</i>
Mesa Verde Black-on-white.....	1	6
McElmo Black-on-white.....	12	70
Mancos Black-on-white.....	4	23
Total.....	17	99

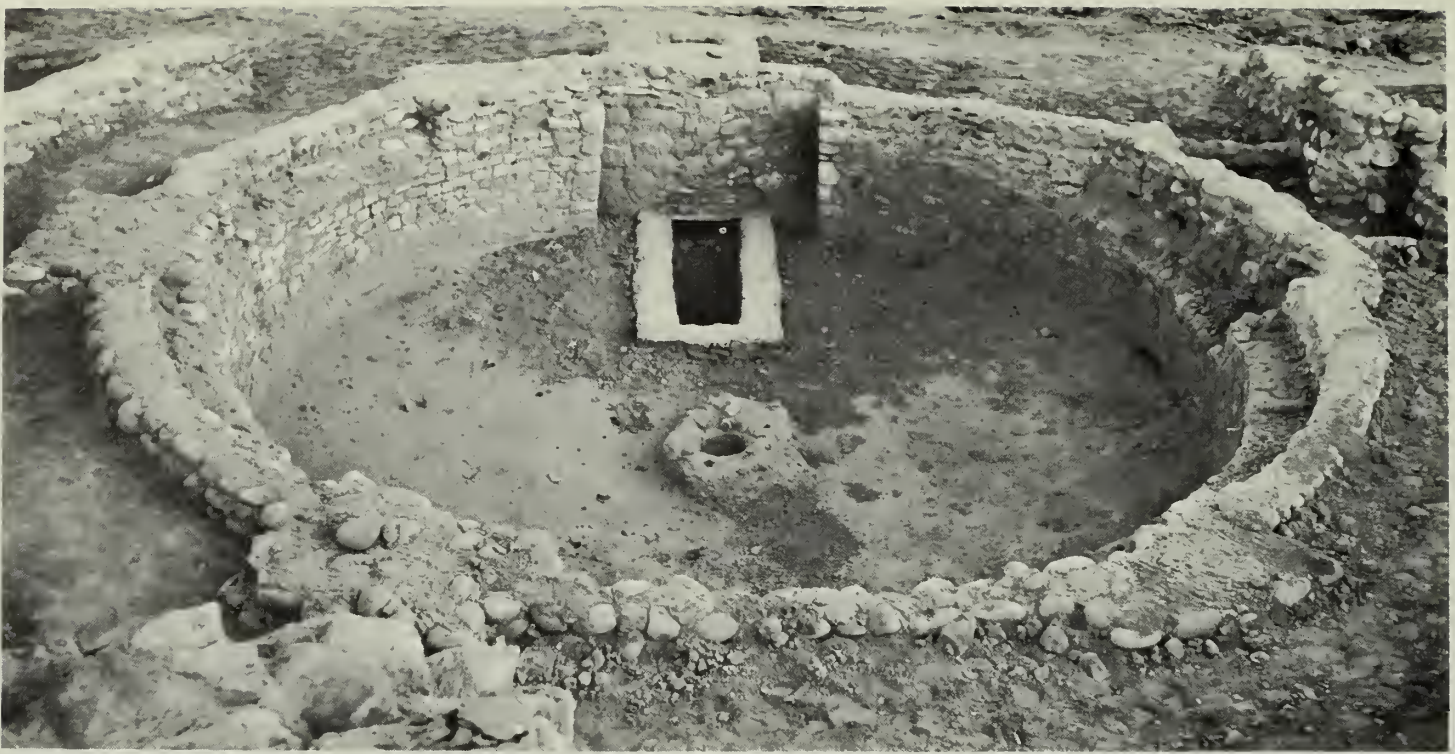


FIGURE 10. A general view of Kiva 2, looking south from the Tri-wall. The subfloor ventilator trench has been partly rebuilt to bring it up to the approximate floor level.

Room 18—subfloor fill			
<i>Sherd type</i>	<i>Number</i>	<i>Percent</i>	
Mesa Verde Black-on-white	55	75	
McElmo Black-on-white	17	23	
Tusayan Black-on-red	1	1	
Total	73	99	

Kiva 2.—Kiva 2 (Fig. 10), south of the Tri-wall, is 15 feet in inside diameter with standing wall 3.3 feet high. This is the height of the bench, which was intact in the east half but partially destroyed in the west. The kiva is circular, not of the keyhole shape, but there is a slight recess 0.9 foot deep between the ends of the bench at the south. Three masonry pilasters are present in the intact eastern half and the assumption is that there was a total of six. The bench is 0.9 foot wide and the pilasters are set back 0.2 foot from the bench face. They are 3 to 3.1 feet long. Wall construction is faced excavation as high as the bench top. Above this a few remaining stones suggest that the upper wall was faced on both sides. Facing of the bench wall is small sandstone blocks, random ashlar, with occasional small cobblestones split to present a plane surface. Split cobbles are more frequent in the facing of the ventilator shaft. The floor is gone and no floor features remain except the lower part of the subfloor trench of the vent shaft. The fill contained no remains of beams, casts, or other indications of roofing.

FILL: The fill in Kiva 2 is intimately tied in with the large stratigraphic section surrounding it. The stratigraphic conditions in and adjoining the kiva are best seen in fig. 44 of stratigraphic Cut 4. Kiva 2 was sunk into the rather shallow basal refuse related to structures earlier than the kiva. Fol-

lowing construction, additional refuse accumulated against the north side, in and along the contemporaneous Walls X and Y, which enclosed Kiva 2. The alluvial wash with its deposition of approximately 1 foot of sand over the site did not enter Kiva 2 as the walls were intact at that time.

After the period of abandonment of the site between occupations, when the alluvial deposit was laid down, Kiva 2 was razed by the next inhabitants. The floor surface was destroyed and the features removed except for the bottom of the subfloor ventilator trench. The walls above bench level were taken down. In the kiva the bottom 1.5 to 2 feet of fill was scrap rock and lumps of adobe from this dismantling. This detritus contained few sherds but those recovered ran, in the various stratigraphic sections, from 74 to 97 percent Mesa Verde Black-on-white. Following the dismantling there was a short period of refuse accumulation in the depression, 0.7 to 0.9 foot, and the sherds, with the exception of trade pieces, were entirely of Mesa Verde Black-on-white.

This thin refuse layer in the depression was then covered with what we have termed the seal layer, the sandy clay deposit that appears to have been derived from construction of either the triple-walled structure or the radial walls in this area. This seal layer over the kiva was hard packed and 0.2- to 0.4-foot thick.

Walls X and Y on the ground plan, of sandstone construction, were contemporaneous with Kiva 2, enclosing it during its period of use. They extend through the sterile sand layer and are based on the underlying refuse. When excavated, they did not extend above the refuse of the Tri-wall Level and in all likelihood they were taken down concurrently with the razing of Kiva 2.

Firepit Complex.—This term designates a complex little structure (Fig. 11) consisting of a small bell-shaped pit joined to three rectangular firepits. It is just south of the Tri-wall in what would have been the occupational area between the Middle Level rooms and the refuse accumulations farther south. The outside dimensions of the top of this group, including the neck of the bell-shaped pit but not its expanded bottom, are 4.7 feet by 7 feet. Construction is of cobblestones and small pebbles of varying sizes, all set in abundant mortar. Wall widths range from 0.3 to 0.9 foot. The three firepits appear to have been built as a unit partially enclosing the bell-shaped pit. Interior dimensions of the three pits are 1.4 by 2.3 feet, 2.3 by 2.7 feet, and 1.7 by 3.3 feet. The pits were lined with clay, the corners rounded and depths average 2.4 feet. The oval opening of the bell-shaped pit was 1.3 by 1.8 feet and the depth 3.7 feet. The firepits and the bell-shaped pit were each floored with large oval cobblestones. The interiors of all were deeply burned and the lower fill in each was a thick ash layer containing rather uniform pieces of charcoal. The upper levels of the bell-shaped pit contained ash and large burned cobbles.

Bell-Shaped Pits.—In addition to the bell-shaped pit noted above there were seven more large bell-shaped pits (Fig. 12). Six were confined to the western half of the refuse area; the seventh was under Tri-wall Room 7. Undoubtedly there are additional pits deep under other rooms of the Tri-wall; only a small part of this area was deeply trenched.

The seven pits vary only in total dimensions; the relative proportions of each are similar. No pit was found with a complete rim; all had suffered some damage from the alluvial

wash or had been abandoned shortly before this period. In the seven pits the remaining neck diameters ranged from 3 to 3.8 feet and remaining depths from 4.9 to 5.4 feet. Bottom diameters were 4.3 to 5.5 feet. Construction was of cobblestones in clay mortar and the interiors were plastered. All were floored with large cobblestones of 0.5 to 0.7 foot diameter. All showed intense burning; the walls were fired to depths of 0.2 to 0.3 foot and this burning has caused undercut rings around the bottoms of some.

Fill was a mixture of ash, charcoal, and cobblestones in no discernible layers. Charcoal of 0.2 to 0.3 foot diameter indicated that sizeable limbs had been burned rather than the usual twigs found in firepit charcoal. Every pit contained at least two or three pieces of bone. These, with occasional sherds, were the only consistent inclusions recovered. None of the bone, however, was burned. On the then ground surface adjoining each of the pits were shallow, basin-shaped burned areas of approximate 2-foot diameters. These were not formal hearths but merely areas scraped out of the soil to hold what must have been large fires. A section cut through the fill adjacent to Pit 5 below the Tri-wall showed a superimposed series of three such burned areas separated by 0.1 to 0.3 foot of sand. Indications here and about other pits are that they were in use for long periods of time and that as the surrounding occupational level built up new outdoor hearths were scooped out as the need arose.

These pits, then, are characterized by their large size, their bell shape, and their stone-lined and plastered sides which suggest that time and care were expended on their construction; by the deep burning evidenced on their interiors; and



FIGURE 11. Firepit Complex just south of the Tri-wall. Letters A, B, and C mark firepits. Letter D marks small bell-shaped pit.

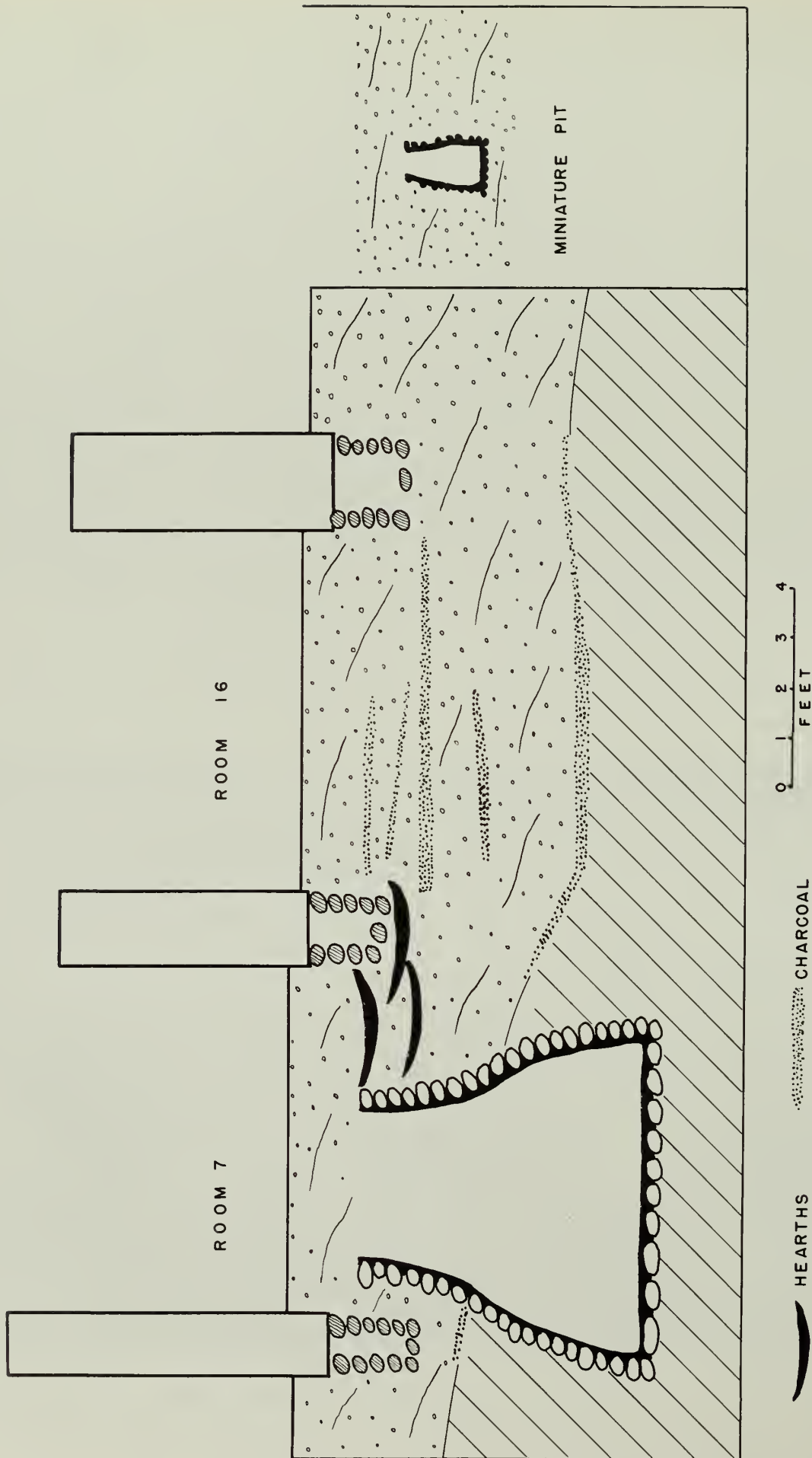


FIGURE 12. Section through Tri-wall Rooms 7 and 16 showing relationship of Pit 5 to hearth areas. Inset, miniature pit at same scale.

particularly by their proximity to shallow hearth areas in which, it seems most probable, the large fires used in the pits were started. In one case the bell-shaped pit was built in conjunction with a masonry firepit complex. Similar pits have a wide distribution throughout the prehistoric horizon in the Southwest and ethnologic data records their continuing use as a form of earth oven.

Haury (1940: 56-62) has reviewed the use of earth ovens in the Mogollon and Hohokam areas. They are characterized by large amounts of hearth stones in and about the pits, a circumstance not encountered farther north in the Anasazi area. Later (1945: 37-39) he sketches their nearly world-wide distribution and their historic use by Hopi, Zuni, Navajo, Apache, Paiute, Yavapai, and Pima. Di Peso (1956: *passim*) reports similar bell-shaped, adobelined pits (his type 3) as features of the Pima architectural complex at San Cayetano del Tumacacori. Earth ovens are considered there as an indigenous Ootam trait extending back to Cochise times (Di Peso, 1956: 253-259).

Roberts' descriptions of somewhat similar pits with a vent or flue extending from one side up to the surface of the ground, at both Whitewater (1939: 55) and on the Zuni Reservation at the Village of the Great Kivas (1932: 44-47), have been extensively quoted. From Nalakihu, a Pueblo III site north of Flagstaff, King (1949: 54-69) described 16 large pits. Of these, eight had undercut sides and were comparable to those under discussion. None however were plastered and "... fire hardening was not marked. Hearth or cooking stones were rare to nonexistent." Charred corncobs were recovered from two of the eight pits.

King reviewed modern Hopi use of and terminology for earth ovens, concluding that earth ovens with flues, properly termed *goishi* ovens, were for cooking corn in the husk and that those without flues were *pi-gummi* ovens for cooking corn mush or pudding. Beaglehole (1937: 44), in referring to the use of deep, bottlenecked pits near the fields for roasting freshly harvested corn, does not indicate if they are equipped with a vent. The same author (1937: 66) notes that among the five types of oven known, the preferred form is a pit some 18 inches deep and 1 foot wide.

The above digression points up my hesitancy in simply listing the pits at the Hubbard Site as earth ovens for cooking fresh corn or mush. There were undoubtedly more of these bell-shaped pits than we found. They seem to be too numerous and elaborate, and to have received too constant a use to have been limited to seasonal cooking of freshly harvested corn. Pits with bottom diameters of 4 feet to 5 feet and depths of about 5 feet also seem rather large and somewhat awkward for cooking corn puddings. There is nothing to preclude their use for a number of purposes. Morris (1939: 97) remarked that they could have been used to fire pottery or equally well for the production of charcoal. In this connection Shepard has noted that pit firing of pottery produces an abundance of charcoal, an item recovered in some quantity from these pits at the Hubbard Site.

Strangely, similar bell-shaped earth ovens have not been reported from the Chaco proper nor from Mesa Verde. They were fairly common in the La Plata area just west of the

Hubbard Site. Morris (1939: 96) notes that there were scores of them at various sites on the La Plata. Steen (1958: 112, 113) has recently reported the first occurrence of such a pit, containing charred corn, from the high plains area, northwest of Clayton, N. Mex.

Miniature Pits.—There were three examples of miniature bell-shaped pits. Two were found outside, at approximately the last ground level, at the northeast curve of the Tri-wall, when grading this area of wall debris. We could not place them relative to periods of occupation in the site. The third example occurred in the stratigraphic sections. It was cross-sectioned and it is this example which is described. The remaining two were identical except for minor variations in dimensions. This last pit was in a stratigraphic section which included the fill of Kiva 2 south of the Tri-wall. It had been constructed after the kiva was abandoned and filled. Over the kiva fill had accumulated or been laid down a seal layer of sandy clay that was the occupational surface of the last occupation, that of the Tri-wall. The miniature pit had been dug through this last occupational surface and it was in a thin layer of ash and heavy debris from fallen walls of the last period.

This pit is 1.5 feet deep, 0.8 foot in diameter at the bottom, and 0.5 foot diameter at the top. In construction it is identical with the larger pits. The sides are clay, deeply burned, the bottom is a layer of small burned river pebbles; the fill was ash, charcoal, and burned pebbles.

This third example at least is clearly later than the large bell-shaped pits, but it and the other two were similar in all respects except size. Its small dimensions would seem to preclude use in firing pottery, and, as we remarked when cleaning these out, they would have at least served to roast one or two ears of corn.

Cobble Structure.—Also of Middle Level construction, apparently, is the small cobblestone structure, Pit Z of the plan. It lies 17.5 feet south of the Tri-wall and was sunk through the lowest levels of refuse already accumulated there. The structure is 5.7 feet wide by 7 feet long. The north wall was largely removed. Maximum remaining height of the other walls was 2 feet. Construction is of a single row of cobblestones in abundant mortar, the walls slightly less than a foot wide. The floor level was indistinct. The interior of this pit or room shows some burning and we have referred to it variously as a room or as a large firepit with some possible connection with the bell-pits in that general area. It had filled with sand, and later one wall of a subsequent structure had crossed the southern end.

Tri-wall Level

The Triple-walled Structure.—The massive, circular, triple-walled structure is the last period of construction on the Hubbard Site. This building is 64 feet in outside diameter and has a maximum height of 7 feet; two heavy radial walls now extend to the south, and remnants of other heavy walls disappearing under the road suggest that the circular building formed one corner of a group of structures. The triple-walled building is essentially just that; three concentric



FIGURE 13. *Top:* Exposed wall on the west side. Abundant mortar and soft stone contribute to the rapid disintegration of exposed walls. *Bottom:* Masonry on the west side, looking east. Note heavy rubble in the core of wall in the background.

circular walls, the spaces between the outer two rings being divided into rooms by partitions. There are 8 rooms in the inner circle and 14 in the outer row, a total of 22 rooms, not including the central area. The rooms in the inner group are 6.5 to 7 feet wide (between circular walls) and they are slightly wedge-shaped. The length at midpoint, an average, runs from 11 to 12 feet. In the outer row the rooms are 7 feet wide. Thirteen of these rooms range in length from 10 feet to 10.5 feet. The fourteenth room, number 15a, is only 5 feet wide and Onstott considered it a passageway.

CONSTRUCTION (Fig. 13): The three circular walls are heavier and extend deeper into the underlying sand than do the partition walls. The three circular walls were constructed first and were continuous. The partition walls were then added, and in each case abut against the circular walls. At several junctures it can be demonstrated that the circular

walls received at least one coat of plaster before the partition walls were constructed.

The footings of both circular and partition walls are large river cobbles set in abundant mortar. Footings of the circular walls are 1.5 to 1.8 feet in width and extend to a depth of 1.7 feet below the floor level. The partition walls are only somewhat lighter; the cobble foundations, 1.5 feet wide, extend only 0.8 foot below the floor. The walls are also massive, 1.2 to 1.5 feet thick; they are of cored masonry faced with rather soft tabular sandstone blocks. Workmanship is fair to good.

While some similar structures have been referred to as "towers" the amount of wall debris in the site indicates that it was never more than about 12 feet high.

DOORWAYS (Fig. 14): There are 10 definite doorways in the site, with an eleventh probable in Room 15a where collapse

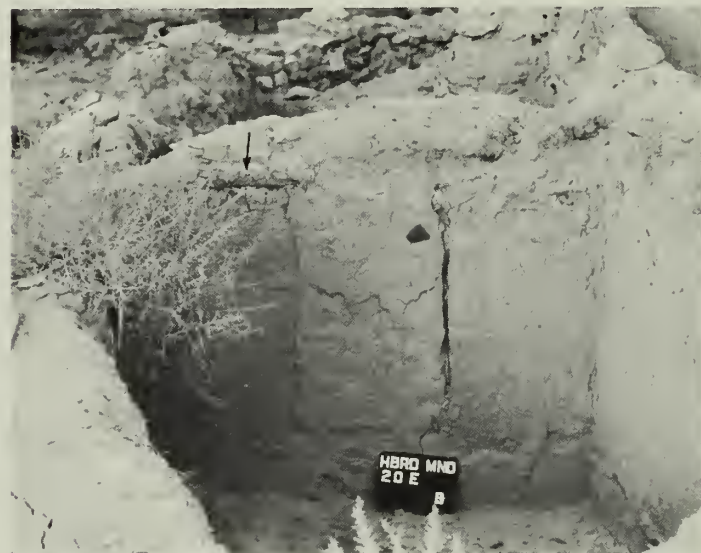


FIGURE 14. *Top:* Filled doorway between Rooms 20 and 21. A part of the particularly long vigas over these doorways is exposed at the left. The wall surface here is typical of heavily plastered rooms not exposed to weathering. *Bottom:* The only certain doorway in an exterior wall of the Tri-wall. It is much smaller than the doorways connecting rooms in the interior.

of the south wall did not leave sufficient height to determine the absolute presence or absence of a doorway. The distribution of doorways is peculiar (see ground plan, Fig. 5). There were no doors in the partition walls of the inner circle. All access to these rooms must have been through hatchways. It is also worth noting here that if the central area was ever used as a "plaza," it too was entered from the top. In the outer circle there are three doors between adjacent rooms in the southeast quadrant and one door at the northeast. There are four doors in the southwest quadrant.

Only one doorway connects the inner and outer circles of rooms, between Rooms 6 and 15a. This is a large door 3 feet wide. There is one demonstrable door to the exterior in Room 9 on the west side. The other probable exterior door was in 15a at the south where it would have opened between the heavy radial walls.

Aside from 15a, described above, the doors are rather small, 1.7 to 2.3 feet wide and, where intact, 4 feet high. The sills vary and are from 0.6 to 1 foot above the floor level.

The best workmanship in the site is evidenced in the doorways. The jambs were trued and the surfaces were smoothed by grinding after laying. All surfaces were then plastered. Sometime subsequent to their construction they were filled with a variety of coarse material, primarily cobblestones and heavy mortar, and this surface also was plastered. Whatever the time interval between construction and filling, the last use of the Tri-wall saw the exterior door in room 9 and all doorways filled, and access restricted to hatchways.

FEATURES: There were no firepits or floor features of any kind in the rooms. This might suggest that the rooms were not used for domiciliary purposes, but quantities of metates and manos were recovered from the fill of these rooms. None of the latter has been definitely ascribed to floor level, and it is the feeling of this writer that they had probably been originally on the roof.

One small opening, slab-lined and 0.3 by 0.4 foot, is 5 feet above the floor in the wall between Rooms 1 and 21.

PLASTER AND FLOORS: It has been noted above that the circular walls were plastered at least once before erection of the partition walls. An additional three to four coats of plaster remain on the partition and circular walls. In Room 13 one of the lower plaster layers is soot-blackened, though there is no firepit or evidence of a fire on the floor. The last coat of plaster in Room 19 was painted red, a fairly common occurrence in the West Ruin nearby. Floors were a single layer of sandy soil, thin and showing little use. There was no sequence of floor surfaces.

PREVIOUS EXCAVATION: Before discussing the fill in the site and the material recovered, it should be noted that nine rooms in the Tri-wall had been previously opened, and most of these reroofed and used as root cellars, so that our knowledge of the fill conditions and material in this section of the ruin is a little less than complete. Earl Morris (letter of November 12, 1946, to E. K. Reed) recalled that about 1918 one J. S. Palmer excavated one exterior room on the north side. Quoting from the letter: "On the floor were skeletons sprawled out as if not prepared for burial and goodly portions of Mesa Verde vessels, somewhat degenerate as I remember

them." Of the nine rooms that had been opened (some reroofed up to 1953), five were in the outer row, Rooms 9, 10, 11, 12, and 17. Four in the inner circle, Rooms 5, 6, 7, and 8, had not been so completely cleared. This excavation and re-use caused very little damage to the walls, and it does not appear that any floor features were removed. As far as details of construction go, I think that we have lost little if anything through this previous excavation. But in dealing with the fill, materials from the rooms, only 60 percent remained for this study.

FILL: In the 13 rooms not previously cleared, Onstott found definite remains of a fallen roof in only one, Room 15, where he removed fallen vigas and juniper splints (Fig. 15). At the north end of Room 17, in a corner not previously cleared, were the probable remains of vigas from an original roof. Such indications of roofing, however, as adobe casts, roof clay and juniper splints were fairly abundant in the remaining 11 rooms. In all cases where they occurred, refuse deposits were below these roofing materials. Room 3 was the only one to show even slight ash deposits above as well as below the roofing. Trash deposition in the rooms was not extensive. Refuse was recorded for only six, or about half, of the intact rooms. These were Rooms 2, 3, 4, 6, 14, and an undisturbed part of 17. This is roughly the undisturbed eastern half of the ruin and it is probable that the disturbed rooms in this eastern half also contained refuse.

It would appear that the refuse in these six rooms was dumped through hatchways while the roofs were still intact. The lack of any timber remains, except in one and possibly two cases, suggests that the larger beams were salvaged for re-use elsewhere and that following this the use of the site for refuse deposits practically ceased. In Room 16 there were two child burials slightly above floor level in the roofing clay. We also note Morris' observation (letter of November 12, 1946) that the burials seen in 1918 were sprawled on the floor.



FIGURE 15. Viga remains in the fill of Room 15. This and one other room contained the only definite roofing remains aside from casts and splints.



FIGURE 16. *Top:* Kiva 1, the kiva in the center of the Tri-wall structure. Looking south at the circular firepit and the floor opening of the vent shaft. Judging from the conditions found in the central kiva at Mound F, the masonry pilasters on the bench here are very close to their original height. *Bottom:* Kiva 1 in the center of the Tri-wall, looking north. Four of the eight randomly spaced niches are visible here.

The artifact material recovered from the fill in the six rooms included 21 manos from Room 1; 7 axes, 5 manos and 2 metates from Room 2; 3 axes and 7 manos from Room 3. The total artifact inventory does not suggest long or continued use of the site as a trash repository. There were only slightly over 500 decorated sherds from the rooms as well as a total of 43 manos, 5 metates, 15 bone awls, 17 fragments of worked bone, 1 fragment of a tchamahia, 1 stone bowl, 1 broken chipped blade, 1 drill, 1 mug, and 1½ bowls from the burials.

Enclosed Kiva (Fig. 16).—As originally constructed, the Tri-wall building enclosed a central circular area 24 feet in diameter. It was Onstott's belief that, since he found a packed "floor" surface immediately adjacent to this plastered wall, the interior circular area had been used as a plaza (with entrance over the roof tops). This may be correct. How-

ever, we have seen that the circular walls were plastered before the partition walls were erected, so that plastering would seem to be just one required step in wall construction. On the other hand, an open central area would be similar to that presumed for the triple-walled structure at Pueblo del Arroyo in Chaco Canyon.

At any rate, sometime subsequent to the construction of the triple-walled building, and it may have been immediately, a kiva (Kiva 1) was constructed within this central circular area. The kiva floor is 3.6 feet below the level of the Tri-wall floors, and the kiva does not utilize any part of the Tri-wall in its construction. The walls are separate. There is a space of 1.5 feet between the kiva wall and the inner circular wall of the triple-walled building.

Kiva 1 is 18 feet in inside diameter above the bench and 15.8 feet at the floor. Maximum depth is 10.7 feet. The bench is 3.4 feet high and, with its width of 1.3 feet, is narrow in proportion to height. Rising from the bench are 8 low masonry pilasters with an average width across the face of 2 feet. They are low—1.5 feet—and this appears to be very close to their original height. The method of roofing may possibly have been cribwork starting from this low pilaster height. No timbers or casts remained and this speculation on the roofing is not demonstrable. Poles were found in place in the kiva at Mound F, also on the monument, and their use is discussed further in that section (see Mound F, following).

FLOOR FEATURES: These were a subfloor masonry lined ventilator shaft, a raised masonry deflector, and a deep circular firepit with raised rim.

CONSTRUCTION: Walls and bench are of tabular sandstone masonry, the blocks somewhat smaller and the wall exhibiting slightly better workmanship than the triple-walled building. The difference is not great enough to consider it a distinct masonry style. The face of the bench contained eight rectangular niches of varying size and in no regular arrangement. The smallest was 0.2 by 0.3 foot, the largest 1 by 1.1 feet. They ranged from 0.4 to 1.1 feet in depth and from 0.2 to 1.9 feet above the floor. There were multiple coats of plaster on both bench and wall; that on the bench and pilaster faces was red, the remainder white.

SUBFLOOR: During the October-December work we had occasion to remove part of the floor in tracing Kiva 3 which lies in small part below the level of this kiva. It showed that here also the kiva had been dug through the sandy alluvial wash into a level of small cobbles and gravel. The base material was this gravel. Over it had been laid a thick layer of juniper bark. The bark still showed slightly over an inch thick. The clay floor of the kiva had been then laid on top of the bark. (See table 1.)

Tri-wall Level, Related Walls (Fig. 17).—South of the Tri-wall and in the area of Kiva 2 are four heavy walls, A, B, C, and D on the ground plan, and three lighter walls, E, F, and G as well as the fragmentary corner of a room shown as H. This excludes Walls X and Y as contemporaneous with Kiva 2. These are only fragments of walls; they were the uppermost structures in this area, and erosion had removed all but the bases of the four heavy walls and all but traces of E, F,



FIGURE 17. The Hubbard Site after excavation and stabilization for interpretive use. The area in the foreground around the radial walls and Kiva 2 had been excavated somewhat deeper in following the refuse levels and has been back filled. Refuse and debris in this general area attained depths of 6 to 7 feet. Compare with Figure 4.

TABLE 1.—*Sherds from Tri-wall room and kiva fills*

Sherd type	Rooms (number)	Kiva (number)	Totals (number)	Percent
Mesa Verde.....	318	223	541	84
Mc Elmo.....	81	13	94	14
Mancos.....	4	1	5	T
Chaco hachured.....		2	2	T
Total.....	403	239	642	98

Note.—Trade types: St. Johns Polychrome, 15; Citadel Polychrome, 1; Houck Polychrome, 1; Smudged, 3.

G, and H. In their fragmentary condition the heavy walls, A, B, C, and D suggest enclosures of 16 by 20 feet and 16 by 39 feet, areas much too large to be considered rooms. These four massive walls with average widths of 2.9 feet are of cobblestones laid in abundant mortar and in this respect resemble the cobble foundations of the Tri-wall structure. Their bases lay in the sterile sand layer which covered the site following the Middle Level occupation. They did not penetrate through this layer to the refuse level below.

While the four heavy walls were based in the sterile sand, they were also abutted by the thin, sandy clay layer which we have called the seal layer. This was a packed floor or construction level that was laid down or developed immediately following the construction of the four heavy walls. The material of this seal layer may well have been derived in good part from the construction of these four walls.

Walls E, F, D, and G abut either the heavier walls noted above or the Tri-wall itself. The corner walls, H, lie in an angle formed by two of the heavier walls. The mound sloped off sharply here; it was not possible to determine the full extent of H or if it had been joined to other walls. The position of these two groups of walls suggests that perhaps the four heavy walls and their extensions formed large rectangular enclosures in which there were houserooms of lighter

construction and that these houserooms were either built in part against the enclosing walls or, as in the case of H, bore no constructional relation to them.

POTTERY

The several parts of this paper were written at different times. The section on the Pueblo del Arroyo structure in Chaco Canyon was written in 1951, shortly after the stabilization of that site was completed. Since that time we have gained additional data on some of the pottery types represented there; particularly, through subsequent work at the classic site of Kin Kletso, on the place of the so-called McElmo Black-on-white in the Chaco sequence. Additional descriptions of some of the types have also been published. While much of the pottery discussion does not pertain to the Hubbard Site, the pottery descriptions have been consolidated in this one section, which follows in general the 1951 report.

Since no new types are named, a discussion dealing with already named and described types might seem unnecessary. However, data on the associations of the later Chaco wares as they are found in classic Chaco sites are practically nonexistent. The major references to these types and the associations in which they are found are primarily in Hawley's and Kluckhohn's reports on Bc 50 and 51 which while of comparative age are not classic Chaco ruins. It is with the dearth of published material in mind that the following observations on some pottery types are offered. It would also seem desirable to explain as nearly as possible what we mean by each of these pottery types.

Escavada Black-on-white (Figs. 18, 19, 20)

Escavada Black-on-white did not appear at the Hubbard Site. It made 21 percent of the sherds from the Tri-wall in Chaco and was the third most prevalent type found there.



FIGURE 18. Escavada Black-on-white from the Tri-wall structure at Pueblo del Arroyo. Design elements of solid triangles, heavy lines, scrolls.



FIGURE 19. Escavada Black-on-white from the Tri-wall at Pueblo del Arroyo. This is the pottery called by Roberts "Degenerate Transitional Black on white." It also appears to be the type which Judd referred to as "Solid Black on white." Note that the surface varies from an unpolished wash with protruding temper to a streakily polished wash.



FIGURE 20. Cross section of Escavada Black-on-white. Temper is predominantly sand with some ground sherd.

This is the pottery which Hawley (1934: 36) first called "Unpolished Black-on-white." She renamed it Escavada in 1936 (1936: 32) and published an additional description 3 years later (1939: 50). There is little to choose between Hawley's description of Gallup and Escavada types: *Escavada*, designs in heavy lines $\frac{1}{4}$ inch wide combined with hatched elements, *Gallup*, more complicated than Escavada, most of the design being at least partly hatched.

This is also the pottery which Roberts (1927: 81-83, 158-169) from his work in the Pueblo Bonito refuse mounds and his sectioning of the Penasco Blanco refuse has called "Degenerate Transitional." He considers the Degenerate to be the breakdown of the previous group of designs (Red Mesa). The paint is mineral, usually a dense black: designs are in heavy lines, solid triangles and triangles with dots or ticking, heavy interlocking scrolls. The surface is covered by a thin wash, sometimes remaining unpolished and sometimes showing a thin, streaked polish.

When Escavada is referred to in this paper it does not include pottery which contains hatched elements in the design.

Placement.—Escavada was listed by Hawley (1934: 32) as Pueblo II, and was so considered in the Tseh So report of 1937 (Brand *et al.*, 1937: 86). Kluckhohn (1939: 155) pointed out that "... the conviction that Escavada preceded such types as Gallup and Chaco Black-on-white in predominant popularity rests on the data from a single site" (the east dump at Chetro Kettle). There are other data to support the view that Escavada was at least made prior to the other two types; and to indicate also that Escavada Black-on-white was a particularly long-lived type, and that it has little value in delimiting a cultural phase with which it is associated except perhaps in a negative way.

Escavada was present in small numbers (12 percent of the decorated sherds) at the Three-C Site, an early Pueblo II

Chaco ruin (Vivian, no date); and it was in use there at a period before the introduction of Wingate Black-on-red, dated as late Pueblo II. Bullen's work at Bc-54 demonstrated the contemporaneity of Escavada and Gallup Black-on-white: They were found in association there in equal amounts, each 35 percent of the total decorated wares (Bullen, 1941: 37-41).

Roberts' sectioning of the Penasco Blanco refuse, at a major Chaco site, provides the best demonstration that Escavada (Degenerate Black-on-white) was a particularly long-lived type. It made its appearance at the bottom of the mound and continued through all levels; and at the top, it would appear from the chart, which does not carry percentage figures, that there was as much Escavada present as Chaco Black-on-white even though Chaco had been made for an appreciable length of time (Roberts, 1927: Fig. Penasco Blanco Sections, 1, 2, and 3). Its continuity through the Penasco Blanco refuse, its appearance at the Three-C Site and in the upper levels at Chetro Kettle, would give Escavada Black-on-white a life span of from early Pueblo II through Pueblo III as known in Chaco, or a period of from 200 to 300 years.

The appearance, then, of Escavada Black-on-white at the Pueblo del Arroyo structure in Chaco, even in appreciable quantity, appears to have no effect of limiting that site to any particular part of the cultural sequence.

Gallup Black-on-white (Figs. 21, 22, 23)

Gallup Black-on-white did not appear at the Hubbard Site. It was present at the Chaco Tri-wall (11 percent) and was fourth in popularity there, exceeded by Escavada, McElmo, and Chaco. This is Hawley's "semi-polished" from the Chetro Kettle dump (1934: 38-41), later renamed and further described (1936: 42-43; 1939: 51). Hawley's description has been noted in connection with Escavada. There

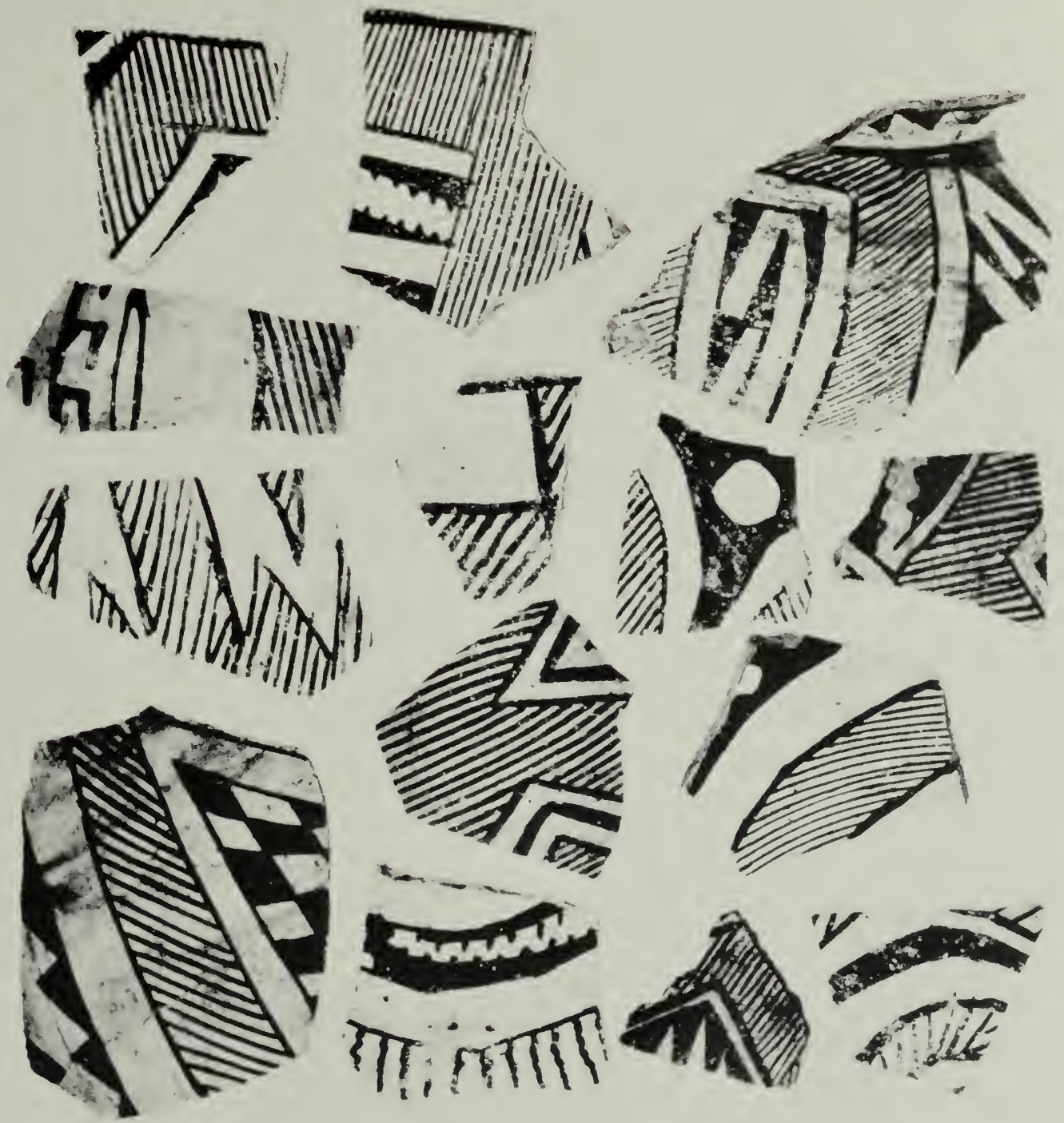


FIGURE 21. Gallup Black-on-white from the Tri-wall at Pueblo del Arroyo. The introduction of hatched design, combined with elements of older designs.



FIGURE 22. Gallup Black-on-white from the Tri-wall at Pueblo del Arroyo. The surface has been thinly slipped and polished.

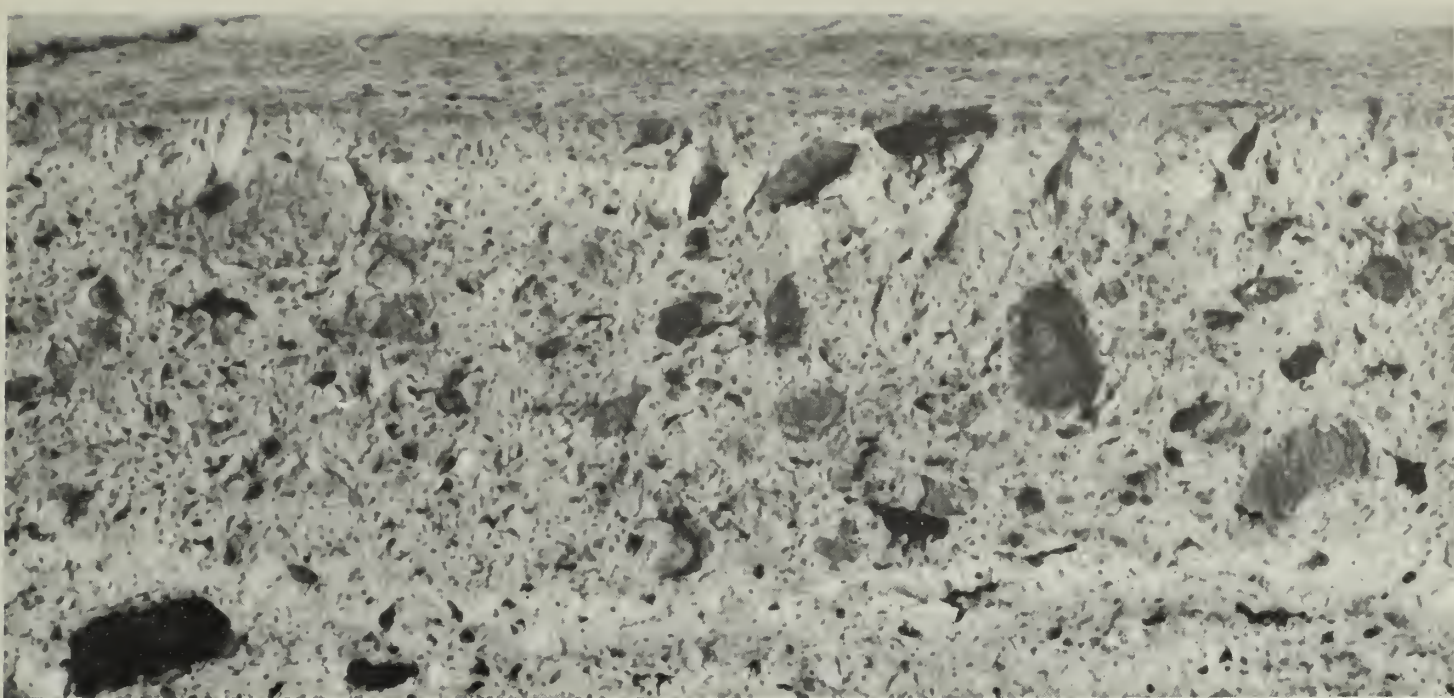


FIGURE 23. Cross section of Gallup Black-on-white. While the temper is usually considered to be crushed sherd, here sherd temper is scattered and the primary material is sand and a dark rock.

appears to be some discrepancy between the description and the pieces figured in the Bc-51 report. Design elements noted in the 1936 description (Hawley, 1936: 43) of Gallup Black-on-white are, "solid designs still used but hatched elements are more common—triangles predominant—scrolls alone or interlocked, their backs edged with three triangles." Plate 6, A, B, C, D of the Bc-51 report illustrates four Gallup pitchers. Of these four the first three show no design elements on the bodies except hachure within bordering lines. As far as can be told from the illustrations there is no difference between the designs on these pitchers and that in Plate 6B, said to be Chaco.

Gallup Black-on-white would appear to be the material which Roberts classified as "Hachures A and B" in his excavation of the Penasco Blanco dump. These hachured types made their appearance about midway in depth in the refuse and continued in increasing amounts toward the top, becoming dominant in the upper third of the stratigraphic columns (Roberts, 1927).

Placement.—Gallup Black-on-white would seem to have slightly greater time value than Escavada since it was not present in the Three-C Site and started later in the Penasco Blanco dump, becoming predominant in the upper one-third. It was the dominant decorated type in one strata at Chetro Kettle, a level to which Hawley assigned an estimated date of A.D. 1090 (1934: 53-54). At Bc-51, Gallup was second in value in the total sherd count and second also in the number of whole vessels found (Kluckhohn, 1939: 39-40).

In classifying this material, for the purpose of making a sharper distinction between Chaco and Gallup Black-on-whites, all is shown as Chaco where hachure is the only design element (with the possible exception of scrolls, etc. on pitcher handles), and as Gallup where hachure is com-

bined with earlier design elements from Escavada and Red Mesa. This more nearly follows the published descriptions, though not all the illustrations.

Chaco Black-on-white (Figs. 24, 25, 26)

This was the predominant pottery type found at the Tri-wall at Pueblo del Arroyo, and it occurred as trade ware in the Hubbard Site. Chetro Kettle is the only other site at which Chaco Black-on-white has been reported as the predominant type at any one time; in two levels in the east dump, in the upper levels of a trench against the north wall, and in the fill of Kiva G (Hawley, 1934: 51-63). It made up 15 percent of the decorated sherds at Bc-54, where Escavada and Gallup were the predominant types (Bullen, 1941: chart). This is the pottery which Roberts called "Hachure C" from the Penasco Blanco refuse. It made its appearance in the upper third of the refuse there and was present in increasing amounts toward the top but never became the most prevalent type (Roberts, 1927: 91-92 and Fig.).

Classic Chaco hachured was of late development and short duration. It has a much greater time value than do either of the two longer-lived types, Escavada and Gallup. It also appears that, despite its late development, Chaco Black-on-white was not the last black-on-white to be made at Chaco Canyon, and that it was superseded by another type before abandonment of the area.

Mancos Black-on-white (Figs. 27, 28, 29)

Abel (1955) has recently divided Mancos Black-on-white into early and late stages, Morfield Black-on-grey and Mancos Black-on-white. Morfield has crushed rock temper and no



FIGURE 24. Chaco Black-on-white from the Tri-wall at Pueblo del Arroyo. Note that the thin slip or wash has worn off or eroded on some of the sherds.

slip; Mancos has sherd temper and is slipped. There are also variations in design. The material which we earlier classified as Mancos Black-on-white would still appear to be Mancos (Martin 1936: 80-94; Colton and Hargrave 1937: 230-231) rather than the earlier phase, except that the sherds which we called Mancos from the Hubbard Site had crushed rock as the predominant temper. The abundance of crushed rock temper in later material, McElmo and Mesa Verde Black-on-whites, at the site is noted below. In view of the persistence of crushed rock temper through the Montezuma phase in this area it still seems reasonable to classify our material as Mancos Black-on-white rather than the earlier Morfield Black-on-grey.

Abel (1955) has also noted the close similarity of Mancos Black-on-white to Gallup Black-on-white. From surface characteristics where the designs are similar it would be difficult to separate these types and we have relied primarily upon the heavy rock temper of the Mancos as a basis for distinguishing the two.

Mancos Black-on-white was present in small amounts (6 percent) at the Pueblo del Arroyo Tri-wall and constituted up to 47 percent of the decorated sherds in lower levels at the Hubbard Site, though it was not associated with the Tri-wall Level there. Its scarcity as trade ware in Chaco Canyon is particularly noticeable when compared with the abundance

of McElmo Black-on-white. Mancos did not appear or was not isolated at Chetro Kettle (Hawley, 1934), nor in Roberts' sectioning of the Penasco Blanco dump. It does not appear at Bc-50 or Bc-51.

Abel's dating of A.D. 950 to 1150 suggests a comparatively long-lived type whose usefulness in sequential problems in the Chaco at least is rather limited. Neither does it coincide exactly in time with the Mancos Mesa Phase, as described, whose characteristic pottery type it is (O'Bryan, 1950: 107).

McElmo Black-on-white (Figs. 30, 31, 32, 33)

McElmo Black-on-white was second in value at the Pueblo del Arroyo structure, and predominant in some levels of the Hubbard Site, though these are levels below the Tri-wall occupation.

This pottery type has had a varied and hazardous existence in the archeology of Chaco Canyon; its existence has been denied by Reed (1944: 51) and reported in large quantity at Bc-51 (Kluckhohn 1939: 43). Hawley was correct when she suggested (1939: 52) that the abundant McElmo Black-on-white found in Chaco was a local product and was not all traded in. She notes that some Chaco cliff ruins show a total of McElmo. Roberts recognized the true nature of the type as found in Chaco sites when he termed it "Chaco/San Juan" (1927: 96-102). In the Penasco Blanco dump this Chaco/San Juan appeared first near the top levels, at approximately the same time that Chaco hachured developed (Roberts, 1927).

This introduction of a carbon paint type near the end of the Chaco occupation marked a final phase in the area, in which the carbon paint type continued to be made after the classic pueblos were largely abandoned. At the ruin of Kin Kletso, McElmo Black-on-white was found to be the predominant type, accounting for 80 percent of the decorated wares in some refuse filled rooms (Vivian, manuscript in preparation). Tree-ring dates as late as A.D. 1178 have been recovered from Kin Kletso (Bannister, 1953). This exceeds by 50 years the latest tree-ring dates obtained from the large classic sites like Pueblo Bonito and Chetro Kettle.

Identification.—The McElmo sherds from the Chaco work, both the Tri-wall and Kin Kletso, were separated visually on the basis of paint; and doubtful sherds, approximately 10 percent, were refired. As a further control a small batch of sherds was sent to Anna Shepard, to check paint identification and for a comparison of the pastes of Chaco hachured iron paint against the pastes of the Chaco McElmo. Shepard (letter of August 15, 1951) examined the sherds through the binocular microscope, magnification 48 diameters, and in this small sample a surprisingly large number of kinds or combinations of temper was revealed. There were 7 variations of temper: 1) sherd temper; 2) sherd and fragments of dark rock with the appearance of sanidine basalt; 3) a very fine paste that has the appearance of untempered clay with only stray fragments of sherd; 4) sandy paste, no sherd; 5) coarse quartz and stray fragments of sherd; 6) dark rock temper with the appearance of sanidine basalt; 7) fragments of a light colored rock (andesite ?) and sherd.



FIGURE 25. Chaco Black-on-white from the Tri-wall at Pueblo del Arroyo.

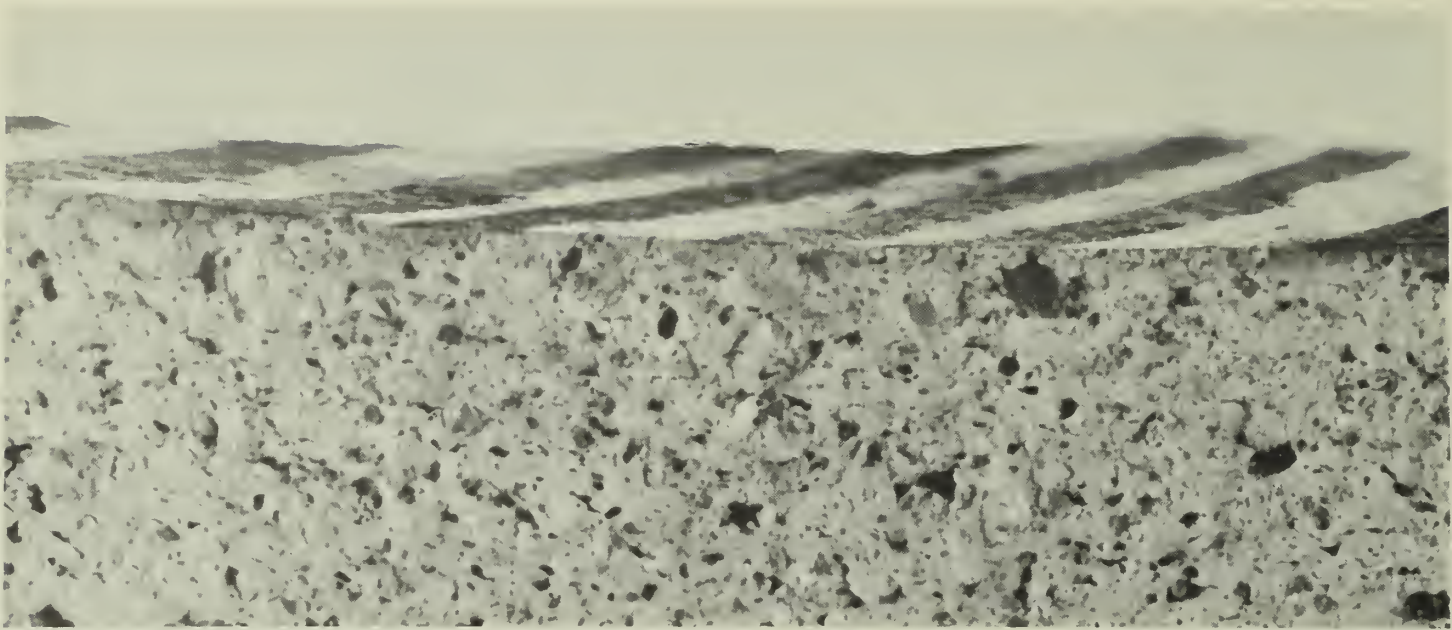


FIGURE 26. Cross section of Chaco Black-on-white. The temper is primarily very finely crushed sherds.

Of these various tempers Shepard wrote that she believed No. 7, the probable andesite temper, to be intrusive. In regard to the other tempers, she stated:

I know of no practicable means of identifying intrusive, sherd-tempered pottery in Chaco. Although there may be other intrusives in your sample, I don't mean to imply that any considerable portion of the carbon paint pottery is intrusive, and I think the sanidine-basalt tempered sherd temper is a good indication of a Chaco product. Carbon paint and McElmo-like design suggest a foreign element moving into Chaco. They would have used local clays and potsherds, and they may well have been following their original technique of tempering.

Throughout this section some reference has been made to Roberts' earlier unpublished work at Chaco. Samples of sherds from this work were sent by Roberts to Shepard and she reported in the above-cited letter that "... his Chaco/San Juan had carbon paint. The paste of the six sherds I thin sectioned is not uniform, five are sherd tempered and two of these contain fragments of sanidine basalt. The sixth is tempered with sanidine basalt, and this I take it is an intrusive from the Chuska region."

Shepard suggested that further work on design and vessel shapes might serve to further isolate this Chaco phase of McElmo Black-on-white. The sherd material from the Chaco Tri-wall is rather limited, but plentiful at Kin Kletso (Vivian: manuscript in preparation). Here there was a preponderance of McElmo, and Chaco hachured was conspicuous by its absence. Until this material can be fully reported, I hesitate to attempt a separation of McElmo material in the Chaco from other McElmo. Substantially, the Chaco phase of McElmo is classic Chaco hachured paste bearing wide-line McElmo designs in carbon paint.

Of particular interest in this connection is Robert's observation on the place of McElmo (Chaco/San Juan) at Pueblo del Arroyo where the National Geographic Society excavations

cleared, in addition to house rooms in the main pueblo, a part of the triple-walled structure attached to del Arroyo. "The predominance of the Chaco/San Juan type at Pueblo del Arroyo is worthy of special consideration. It is quite within the bounds of probability that this pueblo was the center of this ceramic type in the Chaco. A strong factor in support of such belief is to be found in the remains of a razed structure lying to the west of del Arroyo [the Tri-wall]. This at one time was a circular tower with circumferential rooms. Buildings of this type seem to center in the district north of the McElmo Canyon in southwestern Colorado. This is also the region where the Proto-Mesa Verde seems to center. The structure in the Chaco may well have been erected by a migratory group of people from the north. A group which at the same time introduced the Proto-Mesa Verde ceramic forms. All evidence secured in the excavations points to a contemporaneity of the tower building with del Arroyo. The potsherds from the tower were practically all of the Chaco/San Juan type" (Roberts, 1927: 240).

While we have gone somewhat far afield in examining this local carbon paint type of McElmo or "affinis" McElmo, I believe this excursion serves to point up two things. First, that as Hawley, Shepard and Roberts have all suggested, this local manufacture of McElmo Black-on-white, whose genesis is considered to lie north of the San Juan, greatly strengthens the probability of large scale migration into the Chaco, coming at some time very shortly after the development of McElmo Black-on-white. Second, this migration into the Chaco reached its height toward the end of the occupation of the large classic sites. In all probability the manufacture of classic Chaco hachured died out shortly afterwards, and the last inhabitants of the Chaco prior to its abandonment were not making Chaco pottery but a McElmo-like type decorated with carbon paint.



FIGURE 27. Mancos Black-on-white from the Tri-wall at Pueblo del Arroyo.

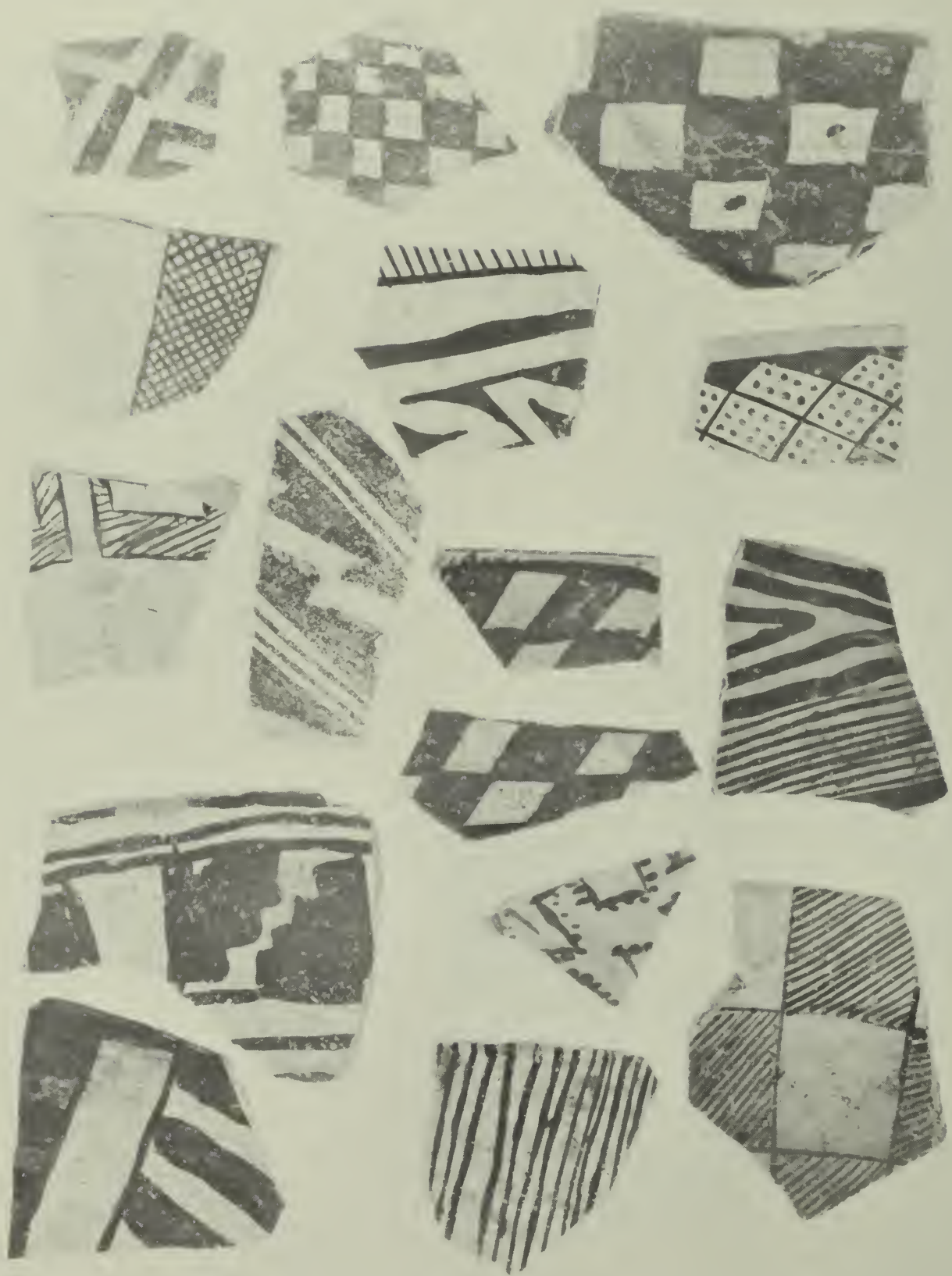


FIGURE 28. Mancos Black-on-white from the Hubbard Site.

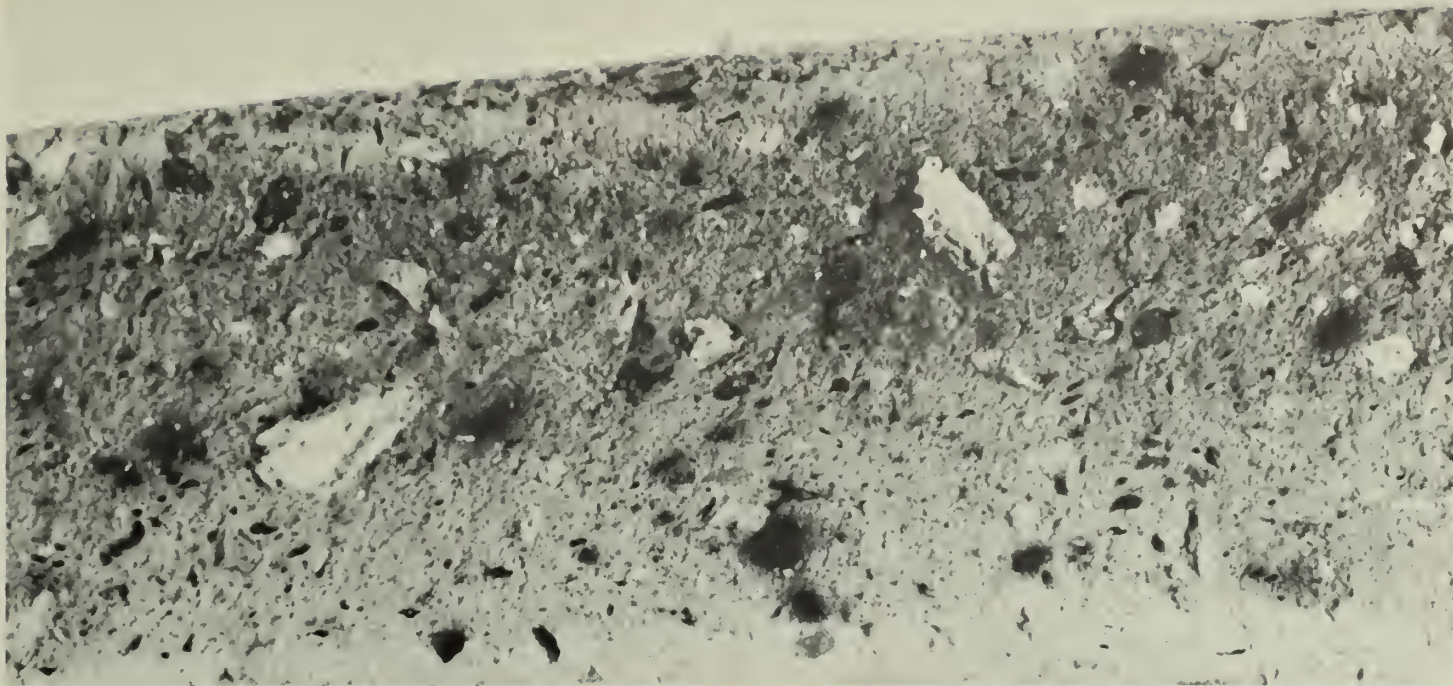


FIGURE 29. Cross section of Mancos Black-on-white. The tempering material here is predominantly sherd with additional dark rock.

Mesa Verde Black-on-white (Figs. 34, 35, 36)

Mesa Verde Black-on-white was the predominant decorated pottery at the Tri-wall Level of the Hubbard Site, to the almost total exclusion of other types. It was only poorly represented at the Chaco Tri-wall at Pueblo del Arroyo—a bare 1 percent of the decorated sherds.

At the time the sherds were classified from both sites I had not had the advantage of Leland Abel's paper on the Mesa Verde pottery wares (Abel, 1955). Subsequent to its publication, samples of the Mesa Verde Black-on-white were re-examined. It was obvious that I had included in this type many sherds which Abel would classify as Mesa Verde Polychrome, a new type. This should not alter the results a bit, however, since the polychrome has the same distribution in time and area as does the Black-on-white and the designs in both are the same.

Abel (1955) also gives the temper of these two types as crushed sherds, with an occasional piece of crushed stone in some examples. Temper in the Mesa Verde Black-on-white at Aztec was predominantly crushed rock and sand. This difference was so pronounced that samples of both McElmo Black-on-white and Mesa Verde Black-on-white were submitted to Abel for identification. His reply confirms our original classification: "Aside from the amount of rock and sand in the temper, I can see no difference between the Aztec sherds and the typical Mesa Verde sherds, and would certainly not hesitate to type them as McElmo B/W and Mesa Verde B/W." (Personal communication, May 10, 1956).

Dittert (1958: 68) also noted a similar variation in temper in sherds he recovered along the San Juan river and on the north edge of Gallegos Mesa in the vicinity of Bloomfield, New Mexico. He reports that sand, andesite, and sherd were often combined as temper in a single piece.

Puerco Black-on-red (Figs. 37, 38, 39)

Of the sherds which have been classified as trade types at both Chaco and Aztec, comment on only one, Puerco Black-on-red seems to be required. The situation regarding Puerco Black-on-red is best stated by Colton and Hargrave (1937: 120, 121):

Some confusion exists regarding the use of the name Puerco Black-on-red since the characters that constitute the type have never been clearly defined, at least by the Gladwins who were the first to name the type but without definition. The Gladwins state that Puerco Black-on-red is intermediate between Wingate Black-on-red and St. Johns Polychrome. Hawley first coupled the name to a description (1936: 47), she assigned to a previous description (1934: 43-44) of an unnamed type found by her in Chaco Canyon to the Gladwin name, Puerco Black-on-red. Hawley's description does apply to a sherd (AT 1960) identified by H. S. Gladwin and donated by him to the Museum of Northern Arizona, although she has included a part of the description of Wingate Black-on-red, which she says Puerco Black-on-red resembles.

In this present paper I have followed the Colton and Hargrave (1937) description of the designs on Puerco Black-on-red, "broad lines, stripes, pattern starts at rim; rims undecorated", omitting that part of other descriptions which seem to apply also to Wingate Black-on-red (Fig. 40).



FIGURE 30. McElmo Black-on-white from Pueblo del Arroyo is essentially a wide-line design in carbon paint on a Chaco Black-on-white paste.



FIGURE 31. While the use of wide lines predominates in the McElmo Black-on-white from Pueblo del Arroyo, there is occasional use of straight or squiggled hachure, dots, and triangles.



FIGURE 32. McElmo Black-on-white from the Hubbard Site.

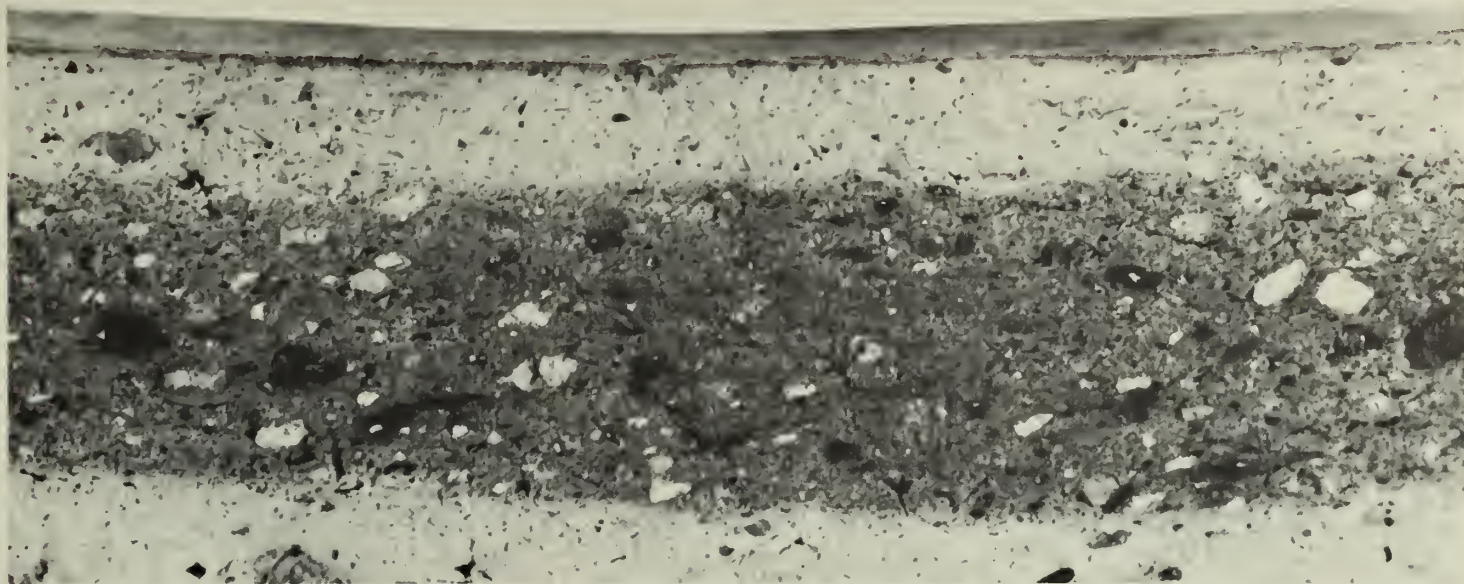


FIGURE 33. This McElmo Black-on-white cross section shows some sand and dark rock temper as well as the more abundant crushed sherd.

From the position of that type which has been classed here as Puerco Black-on-red at both sites and at the ruin of Kin Kletso in Chaco Canyon, it is evident that it follows Wingate Black-on-red in time. The change from the Wingate style of design to the broad lines of the Puerco decoration appears to parallel, in the Black-on-whites, the change from the Chaco hatching to the broad lines of the McElmo. In other words, late in classic Chaco times there was a change in both Black-on-whites and Black-on-reds to a wide line style of design.

Culinary Ware

The amount of corrugated culinary ware in the stratigraphic sections at the Hubbard Site ran from 46 percent to 59 percent of all sherds recovered. Some attempt was made to classify this material, and large sherds could with some certainty be classified from their surface characteristics as similar to either Exuberant Corrugated or Chaco Corrugated. (Hawley, 1939: 50-51). While sorting sherds which were large enough to have carried some of the definitive Exuberant characteristics if they were present—crudely incised designs cutting across rows of coiling, alternating rows of plain and indented coils and occasional punched designs—was comparatively easy, this task became increasingly difficult when classifying small sherds where the definitive characteristics were reduced to size of indented coils and fineness of paste.

In any series from one level we would have Exuberant Corrugated at one end, and definitely smaller, more regular coils and finer paste at the other end but with the great bulk of the sherds as indeterminate between these two extremes. The attempt to classify all the culinary sherds into types based on the fineness of the coils and paste was abandoned.

After the publication of Abel's description of Mesa Verde Grey Ware (1955), several selections of sherds were checked again with the same results. One end of a series would fit the description of the surface characteristics of Mancos

Corrugated and the other end appeared similar to Mesa Verde Corrugated.

The kind of temper employed in the culinary pottery suggests a more usable criterion for its affinities. Abel (1955) gives crushed rock as the temper in both Mancos Corrugated and Mesa Verde Corrugated. The sherds from the Hubbard Site are tempered with a dark crushed rock, sand and occasional pieces of sherd. In the culinary ware from Chaco both crushed rock and sand were employed. Hawley (1939: 51) refers to the crushed rock as black volcanic material. Shepard (in Morris, 1939: 280-281) identifies the dark rock as sanidine basalt. In her study of a limited number of culinary sherds from Pueblo Bonito, sanidine basalt occurred as temper from 55 percent to 87 percent of the time. Judd (1954: 181) also reports that in culinary sherds from stratigraphic trenches in Pueblo Bonito sand was the predominant tempering material in the lower levels but that sanidine basalt increased in proportion until it constituted the tempering material in 56 percent of the sherds in the upper four levels.

While the culinary sherds from Mesa Verde and Chaco are indistinguishable from surface characteristics at this stage, it would appear that the material from Aztec is, by virtue of its mixture of both sand and rock temper, more closely allied to the Chaco ware than to the straight rock temper of the Mesa Verde.

STRATIGRAPHIC SECTIONS

Around three sides of the excavated Tri-wall the debris sloped sharply away to the level of the surrounding fields. On the south and southwest there was a considerable mound 30 to 40 feet in length, north to south, and 50 to 60 feet in width, east to west. There was a dense growth of brush over the mound. The mound surface was covered with large river cobbles and humus. Midway of the slope to the south there were indications of a cobblestone wall.



FIGURE 34. Mesa Verde Black-on-white from the Hubbard Site, bowl interiors.



FIGURE 35. Exterior designs on bowls of Mesa Verde Black-on-white from the Tri-wall Level of the Hubbard Site.

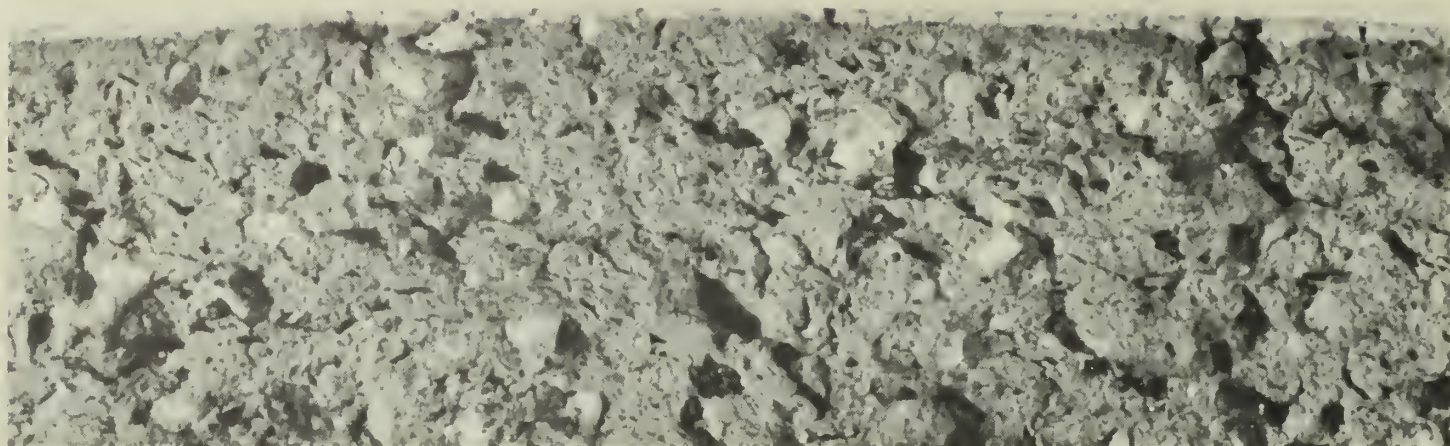


FIGURE 36. Crushed rock and sherd temper in Mesa Verde Black-on-white from the Hubbard Site.

From the floor level of the excavated Tri-wall rooms the mound appeared to be 5 or 6 feet in maximum depth. Tests sunk in the shallow west side had shown deposits of mixed refuse and sand which apparently underlay the indicated cobble walls and perhaps the Tri-wall itself. Chances seemed excellent for a large stratigraphic section. This proved true and altogether five sections were made lengthwise of the area; they ranged from 4 to 8 feet in width and from 28 to 40 feet in length.

For the first stratigraphic section, the tests on the west were lengthened by trenching to expose a north-south profile of the deposits 40 feet long and with a maximum depth of 7 feet. Stratigraphic Test 1 was laid out along this profile. It was to have been 6 feet wide, west to east. Several walls and bell-shaped pits were encountered at the north and it was narrowed slightly at this end. At the south end just beyond Wall B, two burials were found and the deposits thinned rapidly. The test here was narrowed to three feet.

In trenching to develop this first stratigraphic face and in the course of taking it down by levels, five large bell-shaped pits were located. The positions of three of them, in or immediately against the stratigraphic face, are shown in the profile (Fig. 41).

The various levels of deposition are described briefly as they were encountered in each of the five stratigraphic trenches and the sherd counts and percentages of Black-on-white types are shown for each level of each trench. The sherd counts for each level, totaled for all trenches where that particular level appeared, follow in the discussion of the significance of the deposit as a whole.

Trench 1 (Fig. 41)

Length, 40 feet, maximum width 6 feet, minimum width 3 feet, maximum depth 7 feet, removed by natural levels, west to east. The original ground surface below the deposits in this trench sloped slightly to the south for a distance of 25 feet; it rose at this point and then dipped sharply southward. The original surface on which the deposits rested was a fine, buff-colored sand derived from drainage from the north.

Level A (the basal deposit).—This was a sandy layer resting on undisturbed soil and extending under the Tri-wall. It had a maximum depth of 2 feet. It contained few sherds at the north end and, except in the vicinity of the bell-shaped pits, only scattered flakes of charcoal. Adjoining each of the bell-shaped pits were burned areas, large basin-shaped depressions scooped out of the sand, where fires had been built in conjunction with the pits. These burned areas occurred at more than one level around several of the pits suggesting a rather long period of use while the deposit was accumulating. This level was taken down in three vertical sections, numbers 1 and 2 in the north two-thirds and number 3 at the south. The deposit in this south third was separated from the other two cuts by the rise in the original ground level. There is a horizontal change in the deposition south of Wall B at the southern edge of the mound where some mixing with later deposits takes place. Three hundred fifty-one Black-on-white sherds were recovered from Level A. (See table 2.)

TABLE 2.—Decorated sherds, Level A, Trench 1

Sherd type	Cut 1		Cut 2		Cut 3		Total	
	Num-ber	Per-cent	Num-ber	Per-cent	Num-ber	Per-cent	Num-ber	Per-cent
Mesa Verde			2	3	5	2	7	2
McElmo	20	45	41	59	96	40	157	45
Mancos	20	45	16	23	106	45	142	40
Chaco	4	9	10	14	30	12	44	12
Red Mesa			1	T			1	T
Total	44	99	70	99	237	99	351	99

Note.—Trade wares: Puerco Black-on-red, 7; Tusayan Black-on-red, 8; Wingate Black-on-red, 1; unidentified redware with smudged interior, 3.

The seven Mesa Verde sherds are possibly intrusive in this level. They came from the south end of the trench toward a point where in adjoining trenches the stratigraphic cuts were abandoned because of obvious mixing through orchard planting and other farming activities.



FIGURE 37. Puerco Black-on-red from the Tri-wall at Pueblo del Arroyo. Compare with the designs on McElmo Black-on-white.



FIGURE 38. Puerco Black-on-red. Although the great majority of the designs are duplicates of those on McElmo Black-on-white, there are some, note the bottom row, which are reminiscent of Escavada Black-on-white with its interlocking scrolls and ticked triangles.

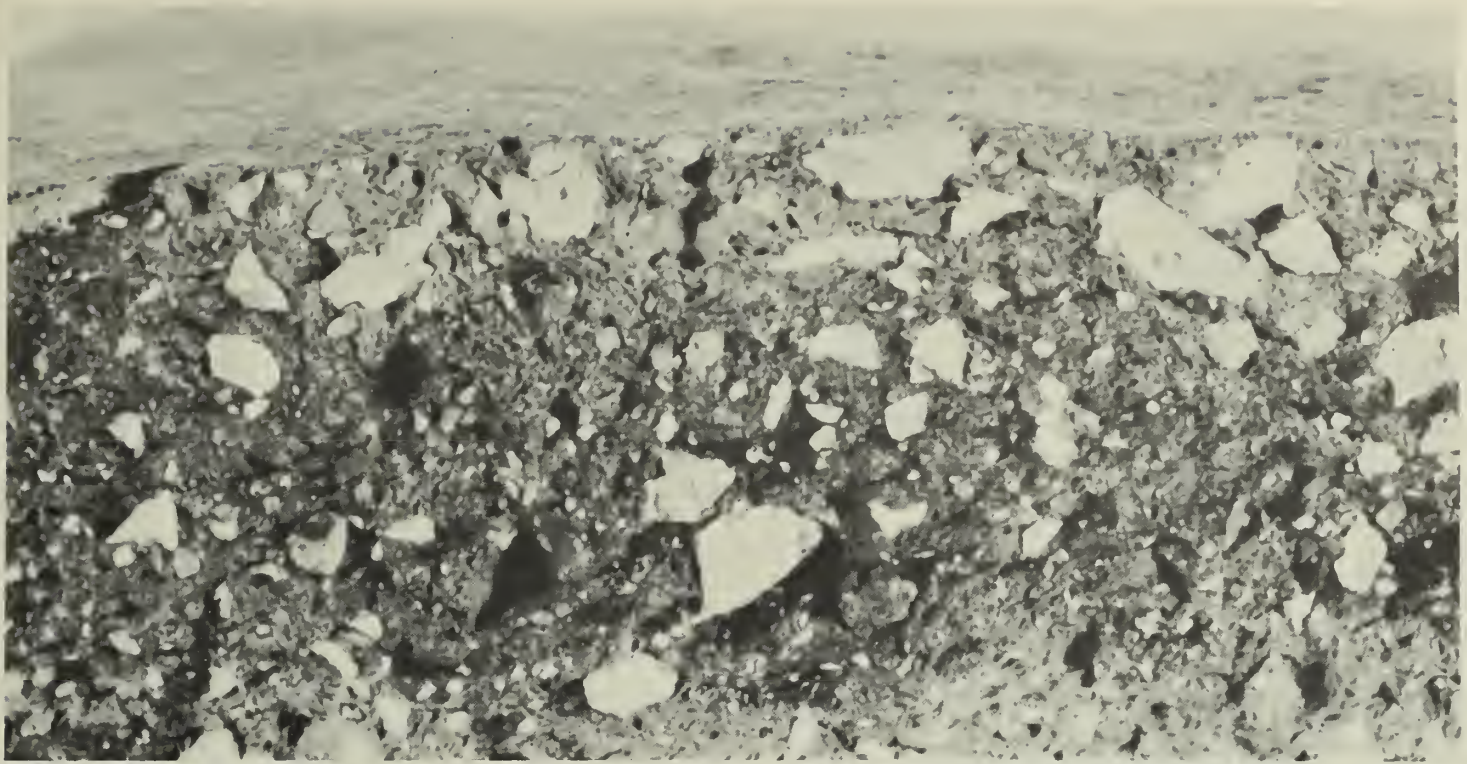


FIGURE 39. Heavy sherd temper shows in this cross section of Puerco Black-on-red from Pueblo del Arroyo. While this is fairly typical, some Puerco Black-on-red sherds have a large proportion of sand temper.

Level B.—This is a shallow deposit at the north end of Trench 1; it has a length of 12 feet and a maximum depth of 1 foot. It is separated from Level A below it by a thin sandy layer. In the field the separation was made on the basis of this intervening sand. The sherd counts however suggest that Level B is part of the same basal deposit and that no great time separated the two levels. One hundred eight Black-on-white sherds were recovered from this level in two vertical sections.

TABLE 3.—Decorated sherds, Level B, Trench 1

Sherd type	Cut 1		Cut 2		Total	
	Number	Percent	Number	Percent	Number	Percent
Mesa Verde.....	2	2	1	3	3	2
McElmo.....	45	56	13	48	58	53
Mancos.....	27	34	12	45	39	37
Chaco.....	7	8	1	3	8	7
Total.....	81	100	27	99	108	99

Level D.—This is a sterile alluvial sand layer with a maximum depth in Trench 1 of 1 foot; it can be traced under the Tri-wall rooms where it has a maximum thickness of 13 inches. The foundations of the south Tri-wall shown in Fig. 41 cut through this layer. It extends 23 feet south of the Tri-wall where it pinched out against the rising deposits of level A. In the area south of the Tri-wall in Trench 1

the upper limits of Level D formed a packed occupation surface. No sherds were recovered from the alluvial deposits of Level D in this trench. (See table 3.)

Level C.—This is a sandy layer on the south slope of the trench where some mixing and redeposition have taken place. It appeared to be an extension of Levels B and D with some mixing with later deposits. The proportion of sand was high; only 87 Black-on-white sherds were received.

Sherd type	Number	Percent
Mesa Verde.....	12	14
McElmo.....	36	41
Mancos.....	33	38
Chaco.....	6	07
Total.....	87	100

Level E.—This is the top ½ to 2 feet of refuse at the south end of the mound lying directly over Level C, above.

Sherd type	Number	Percent
Mesa Verde.....	19	21
McElmo.....	51	56
Mancos.....	17	19
Chaco.....	4	03
Total.....	91	99

Level F.—This is the last or uppermost refuse deposit in Trench 1. It overlay the occupation surface of Level D and was confined within the wall area south of the Tri-wall. It could not be identified beyond this restricted area. The

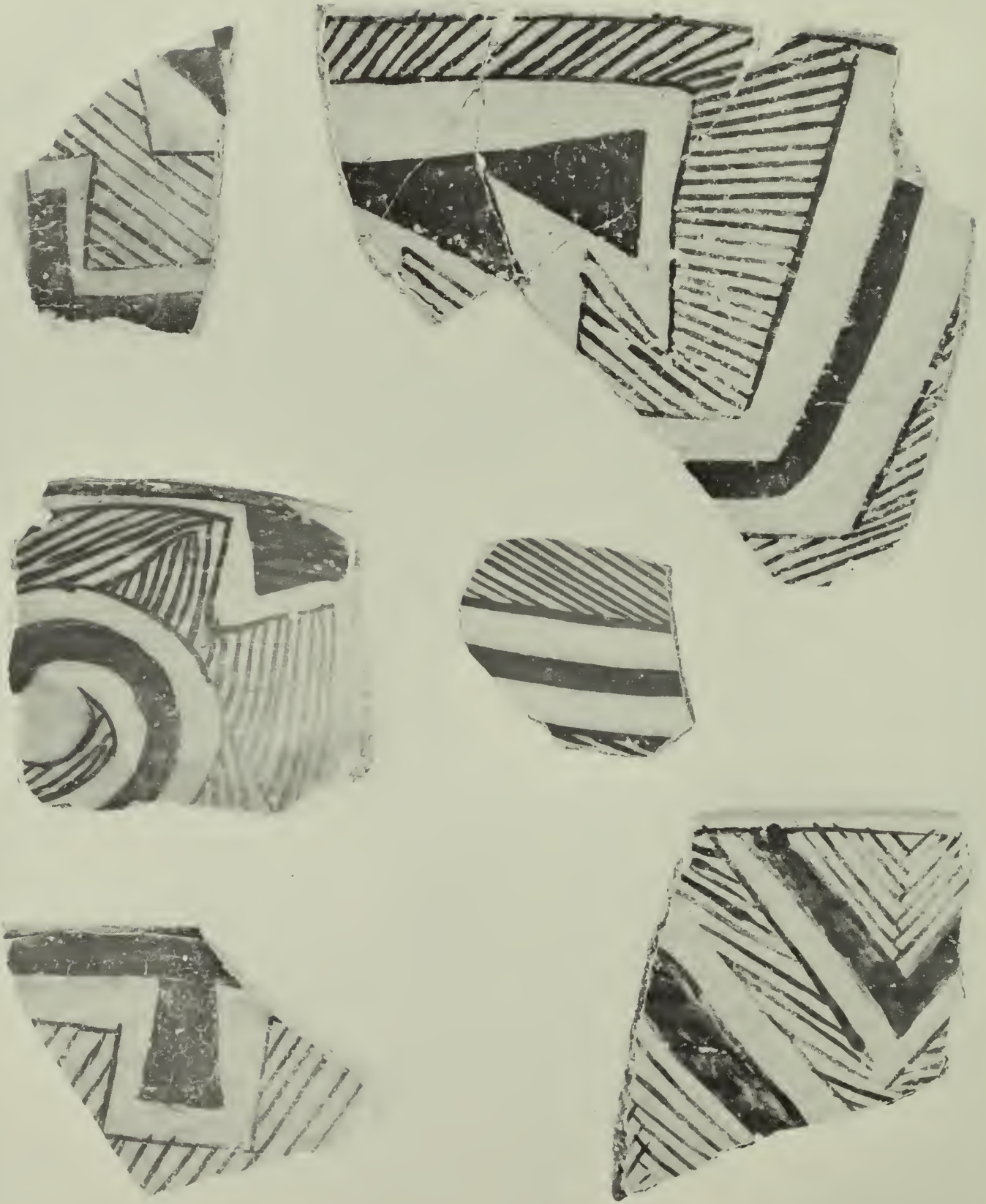


FIGURE 40. Wingate Black-on-red from Pueblo del Arroyo, shown for comparison with design of Puerco Black-on-red.

length was 20 feet, maximum depth 10 inches. Ninety-one Black-on-white sherds were recovered. It was removed in two cuts, north to south. (See table 4.)

TABLE 4.—*Decorated sherds, Level F, Trench 1*

Sherd type	Cut 1		Cut 2		Total	
	Number	Percent	Number	Percent	Number	Percent
Mesa Verde.....	71	97	41	94	112	95
McElmo.....	2	3	2	4	2	2
Mancos.....			1	1	2	2
Chaco.....					1	T
Total.....	73	100	44	100	117	99

Note.—Trade wares: St. Johns Polychrome, 7.

This level is related to the late occupation of the tri-walled structure or to a period shortly after its abandonment when people of the Montezuma Phase were still occupying part of the site.

Decorated sherds from Trench 1 (excluding trade types)

Level	Number
A.....	351
B.....	108
C.....	87
D.....	None
E.....	91
F.....	117
Total.....	754

TABLE 5.—*Decorated sherds, Level A, Trench 2*

Sherd type	Cuts 1 and 2		Cuts 3 and 4		Cut 5		Cut 6		Cut 7		Total	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Mesa Verde.....			1	2	11	18	13	6	5	6	30	7
McElmo.....	22	33	18	45	33	54	123	63	51	60	247	55
Mancos.....	36	54	14	35	13	21	55	28	25	29	143	32
Chaco.....	8	12	4	10	4	6	2	2	3	3	21	4
Black-on-gray ¹			3	7							3	T
Total.....	66	99	40	99	61	99	193	99	84	98	444	98

¹ Unidentified.

Note.—Trade sherds: Citadel Polychrome, 2; Querino Polychrome, 1; Tusayan Black-on-red, 5; St. Johns Polychrome, 2; Wingate Black-on-red, 2.

Level B.—This is a continuation of the same level in Trench 1, though slightly longer here. Length 14 feet, maximum depth 1 foot. It is interrupted by the firepit complex and by a pile of cobblestones at the north side of this pit so that its effective length is reduced to 10 feet. The firepit was sunk into this level at some time subsequent to its deposition. Material from Cuts 1 and 2 are combined.

Wall Debris.—An average of 3.5 feet of wall and surface debris overlay the uppermost deposit (Level F) and thinned out to nothing at the south over deposit E. The very few sherds in this debris were disregarded, as at least part of this top material seems to have been thrown here from excavations within the Tri-wall at the time the various root cellars were being excavated. The material consisted of abundant heavy sandstone blocks from the Tri-wall construction, sand, and thick humus near the top. Throughout the remainder of the stratigraphic excavation here at the south end of the mound this top level of wall debris and humus above the uppermost identifiable cultural deposit was always disregarded since it came in part from the construction of root cellars and other farming activities.

Trench 2 (Fig. 42)

Trench 2 lies east of Trench 1 and east of the westernmost radial wall. An average of 3 feet separates the 2 trenches. Its length is 33 feet, width 5 feet, and the maximum depth 7 feet. Trench 2 was taken down in 5 foot cuts north to south so that each cut represents 25 square feet of surface. An elaborate firepit complex was encountered in Cuts 2 and 3 which reduced their size considerably. As the number of sherds in these and the next two in line was very small they have been combined since there was no change in horizontal deposition between them. The levels which follow are in all cases continuations of the same levels found in Trench 1.

Level A (the basal deposit).—This is a continuation of the same level in Trench 1 but it is somewhat deeper here with a maximum depth of 3 feet. (See table 5.)

Sherd type	Number	Percent
Mesa Verde.....		
McElmo.....	37	64
Mancos.....	15	26
Chaco.....	6	10
Total.....	58	100

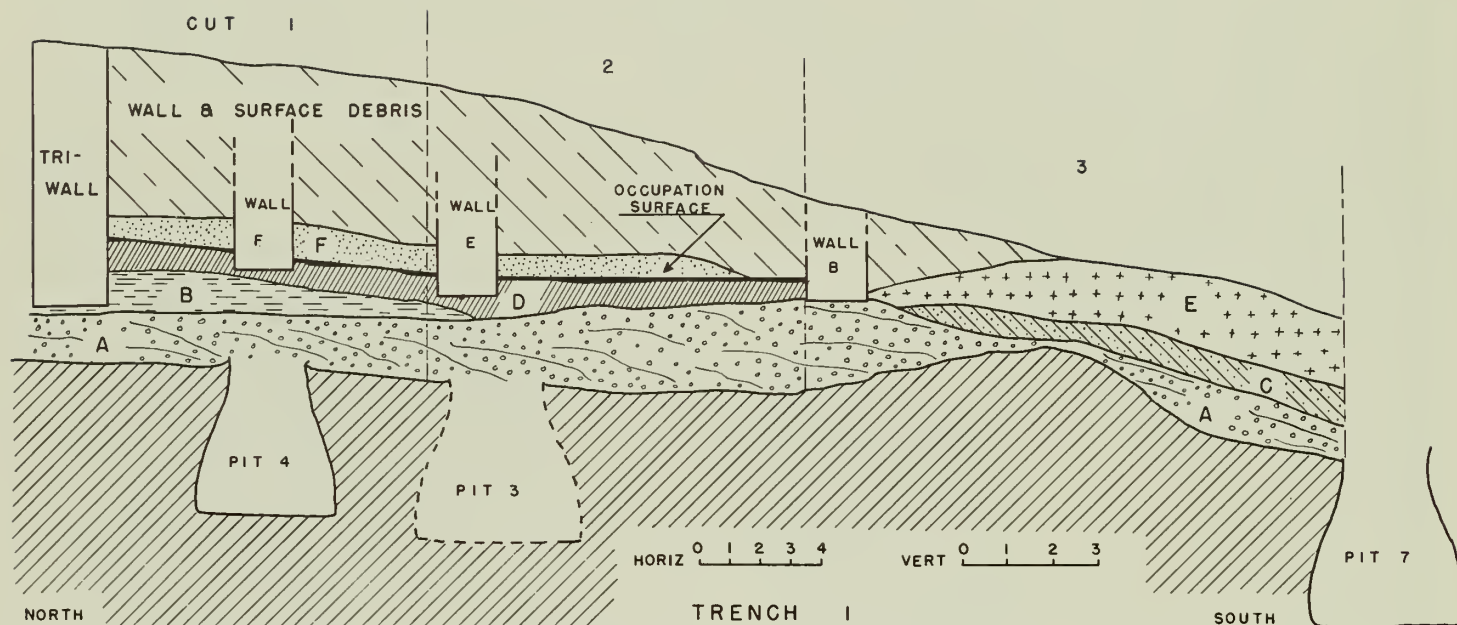


FIGURE 41. Stratigraphic Trench 1, a north-to-south cut on the west side of the refuse area just south of the Tri-wall structure.

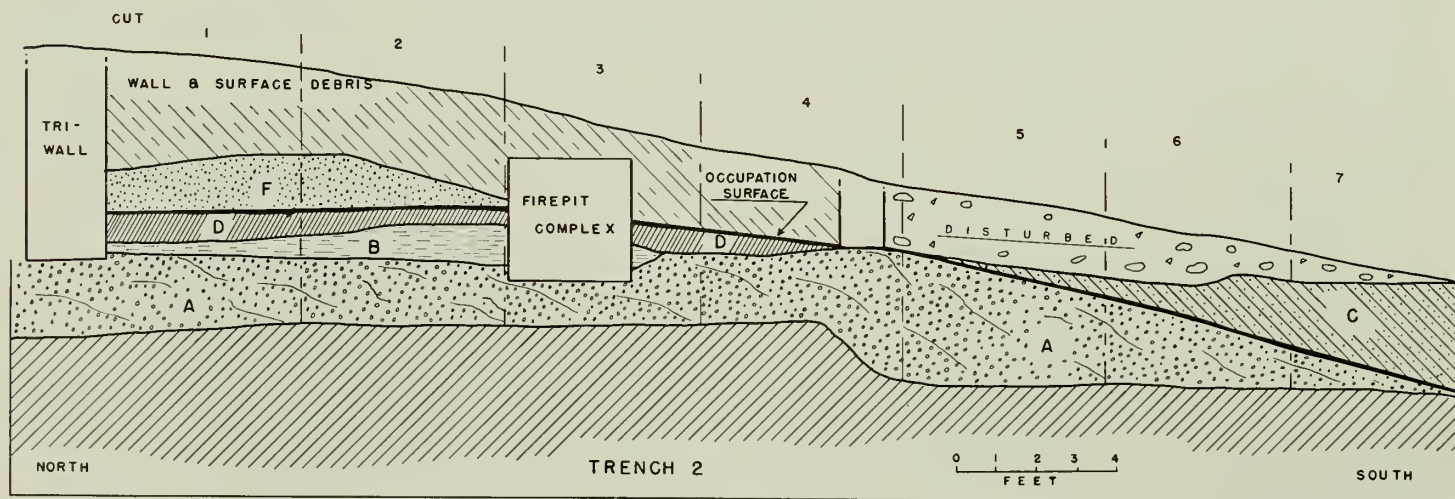


FIGURE 42. Stratigraphic Trench 2. This continues the eastward sectioning of the refuse area east of Trench 1.

Level C.—The mixed deposits at the south edge of the mound comprise this level. Here they underlie in part a cobblestone wall and a large accumulation of cobblestone wall debris. Sherds from Cuts 6 and 7 are combined.

<i>Sherd type</i>	<i>Number</i>	<i>Percent</i>
Mesa Verde.....	69	91
McElmo.....	2	3
Mancos.....	4	5
Chaco.....		

Total..... 75 99

Trade sherds: St. Johns Polychrome, 2; Puerco Black-on-red, 1.

Level D.—The alluvial sand, Level D, is likewise interrupted by the large firepit. There were no sherds in the first two cuts at the north. At the south of the firepit in Cuts 3 and 4, D is not as distinct and the 165 sherds recovered here probably represent some mixing due to construction of the firepit. Total length including the firepit, 18 feet; maximum depth 9 inches. The upper surface of Level D here is also compacted in an occupational surface. (See table 6.)

TABLE 6.—*Decorated sherds, Level D, Trench 2*

<i>Sherd type</i>	<i>Cuts 1 and 2</i>		<i>Cut 3</i>		<i>Cut 4</i>		<i>Total</i>	
	<i>Number</i>	<i>Percent</i>	<i>Number</i>	<i>Percent</i>	<i>Number</i>	<i>Percent</i>	<i>Number</i>	<i>Percent</i>
Mesa Verde.....	0	0	28	30	39	54	67	40
McElmo.....	0	0	49	53	28	39	77	46
Mancos.....	0	0	15	16	2	3	17	10
Chaco.....	0	0	1	1	3	4	4	2
Total.....	0	0	93	100	72	100	165	98

Note.—Trade wares: Querino Polychrome, 3; Citadel Polychrome, 1.

Level F.—A continuation of the same level from Trench 1—upper trash deposits over an occupational level, the upper surface of Level D. The deposits were made after active use of this area adjacent to the Tri-wall structure had ceased. The area between the Tri-wall and the firepit is combined in Cuts 1 and 2; the area south of the firepit is combined in Cuts 3 and 4. Length of the entire deposit was 10 feet, its maximum depth 1.6 feet. (See table 7.)

TABLE 7.—*Decorated sherds, Level F, Trench 2*

<i>Sherd type</i>	<i>Cuts 1 and 2</i>		<i>Cuts 3 and 4</i>		<i>Total</i>	
	<i>Number</i>	<i>Percent</i>	<i>Number</i>	<i>Percent</i>	<i>Number</i>	<i>Percent</i>
Mesa Verde.....	92	98	28	82	120	93
McElmo.....	2	2	6	18	8	6
Mancos.....						
Chaco.....						
Total.....	94	100	34	100	128	99

Note.—Trade wares: Querino Polychrome, 3; Citadel Polychrome, 1.

Decorated sherds from Trench 2 (excluding trade types)

<i>Level</i>	<i>Number</i>
A.....	444
B.....	58
C.....	75
D.....	165
F.....	128
Total.....	870

Level E does not occur in Trench 2. The corresponding area was badly disturbed. There were several rotted boards found here below the surface. It should also be noted that the area contained numerous large cobblestones. This suggests the probability that one of the large radial walls, which were primarily of cobble construction, was destroyed here in clearing for some modern structure.

Trench 3 (Fig. 43)

Length 30 feet, maximum depth 8.2 feet, width 6 feet. It was narrowed to 4 feet in width at the north end by a radial wall and to 2 feet where it passed the curve of Kiva 2. Altogether the kiva, a radial wall, and a masonry pit were encountered in this trench. Here again the cuts were made in 5-foot lengths and were taken down by natural levels. Changes in the natural levels and scarcity of material in some levels made it feasible to combine some of the cuts. Cut 4 is omitted in the upper levels above A because it was occupied primarily by the masonry pit.

Level A.—This is a continuation of Level A in Trenches 1 and 2. Length, 15 feet, interrupted by the masonry pit. Maximum depth 2.5 feet. (See table 8.)

TABLE 8.—*Decorated sherds, Level A, Trench 3*

<i>Sherd type</i>	<i>Cut 1</i>		<i>Cut 2</i>		<i>Cut 3</i>		<i>Cut 4</i>		<i>Total</i>	
	<i>Number</i>	<i>Percent</i>	<i>Number</i>	<i>Percent</i>	<i>Number</i>	<i>Percent</i>	<i>Number</i>	<i>Percent</i>	<i>Number</i>	<i>Percent</i>
Mesa Verde....	5	10	6	15	2	3	3	4	16	7
McElmo.....	7	12	9	22	35	55	38	57	89	40
Mancos.....	36	68	19	47	14	22	13	19	82	37
Chaco.....	5	10	6	15	12	20	12	18	35	15
Total.....	53	100	40	99	63	100	66	98	222	99

Note.—Trade wares: Puerco Black-on-red, 5; Tusayan Black-on-red, 7.

Level B.—Level B, a thin strata above the basal deposit, Level A, occurs in Trench 3 as a short, almost sterile sand deposit which however is differentiated from the overlying alluvium of Level D. It may represent a wind blown deposit. There were less than 10 sherds recovered.

Level C.—This is the lower of three levels at the south end of the mound; it corresponds with the same lettered level of Trenches 1 and 2. Length 10 feet, maximum depth 1.4 feet. It is found only in Cuts 5 and 6. (See table 9.)

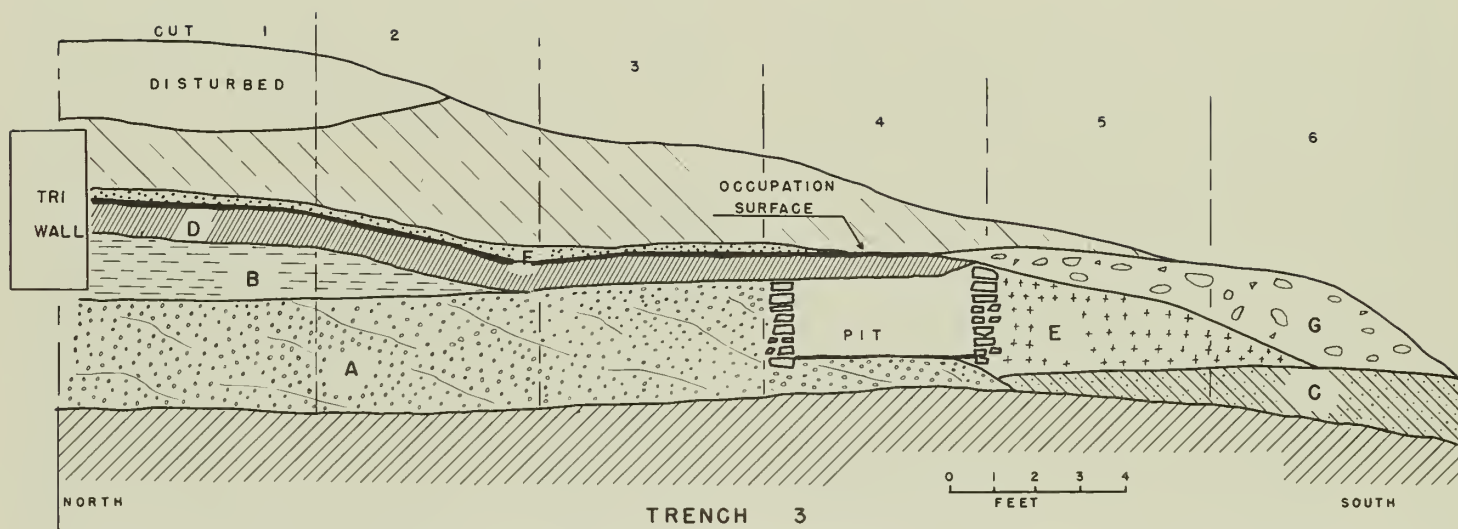


FIGURE 43. Stratigraphic Trench 3 continued eastward, beyond Trench 2, to the west exterior wall of Kiva 2.

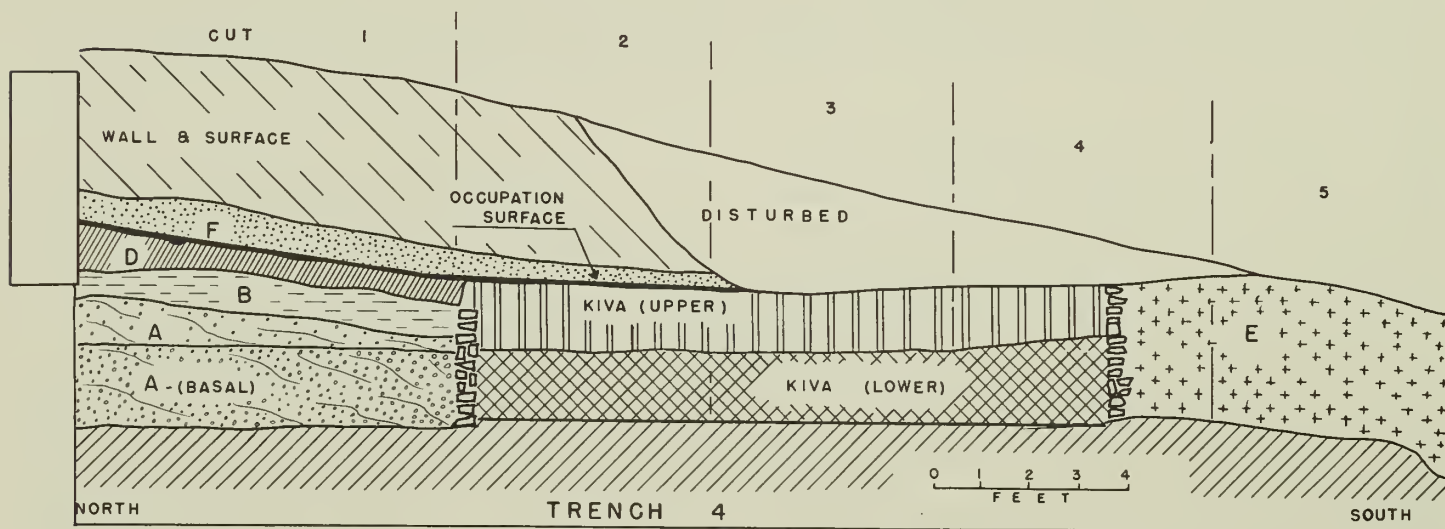


FIGURE 44. Stratigraphic Trench 4 included most of the material from Kiva 2.

TABLE 9.—*Decorated sherds, Level C, Trench 3*

Sherd type	Cut 5		Cut 6		Total	
	Number	Percent	Number	Percent	Number	Percent
Mesa Verde.....	21	32	69	89	90	62
McElmo.....	36	56	7	9	43	30
Mancos.....	6	8	2	2	8	5
Chaco.....	3	4			3	2
Total.....	66	100	78	99	144	99

Note.—Trade sherds: Querino Polychrome, 3.

Level D.—This is a continuation of the alluvial wash shown as Level D in Trenches 1 and 2. It extends out 20 feet from the Tri-wall; it slopes to the south and covers the masonry pit. There were no sherds in this level from Trench 3.

Level E.—A second level of deposit at the south end of the trench; the material is possibly mixed due to construction of the masonry pit bordering the north side of the deposit. It corresponds to Level E of Trench 1. Length is 7 feet and maximum depth 2.3 feet. The entire deposit is included in Cut 5.

Sherd type	Number	Percent
Mesa Verde.....	57	51
McElmo.....	39	36
Mancos.....	8	7
Chaco.....	7	6
Total.....	111	100

Trade sherds: Querino Polychrome, 3; Tusayan Black-on-red, 1.

Level F.—The upper level of deposits in the north 20 feet of Trench 3. Refuse here was not concentrated in a lens or thin deposit as in Trenches 1 and 2 but was scattered thinly over the surface and mixed somewhat with the wall debris. Note from the profiles that this upper deposit, Level F, is thickest and most extensive at the west in Trench 1, thins considerably in Trench 2 and here has become scattered. (See table 10.)

TABLE 10.—*Decorated sherds, Level F, Trench 3*

Sherd type	Cut 1		Cut 2		Cut 3		Cut 4		Total	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Mesa Verde...	81	100	130	80	106	96	67	69	384	85
McElmo.....			18	10	4	3	11	11	33	7
Mancos.....			3	2			17	17	20	4
Chaco.....			14	8			3	3	17	3
Total.....	81	100	165	100	110	99	98	100	454	99

Note.—Trade wares; St. Johns Polychrome, 20; Tusayan Black-on-red, 4.

Level G.—This is the top level at the south end of the trench and appears to be a continuation of Level F. The wall debris here was composed mainly of large cobblestone as opposed to the sandstone masonry more prevalent in the northern 20 feet. Length of deposit, 10 feet, maximum depth 2 feet. (See table 11.)

TABLE 11.—*Decorated sherds, Level G, Trench 3*

Sherd type	Cut 5		Cut 6		Total	
	Number	Percent	Number	Percent	Number	Percent
Mesa Verde.....	18	100	51	80	69	85
McElmo.....			6	10	6	7
Mancos.....			6	10	6	7
Chaco.....						
Total.....	18	100	63	100	81	99

Decorated sherds from Trench 3 (excluding trade types)

Level	Number
A.....	222
B.....	none
C.....	144
D.....	none
E.....	111
F.....	454
G.....	81
Total.....	1,012

Trench 4 (Fig. 44)

Width of the trench 8 feet, length 28 feet, maximum depth 7.5 feet. Trench 3 exposed the west side of Kiva 2 but the sherd counts were confined to the strata outside the kiva. In laying out Trench 4 the western section of the kiva was cleared for the remaining width of Trench 3 to present a profile of the kiva and adjoining strata in one continuous face.

Level A.—The length of Level A was 8 feet, maximum depth 3.2 feet. Level A was here laid down in two weakly defined layers. The lower one merged gradually into the sterile sand below and contained but few sherds and minor amounts of charcoal. Sherds were slightly more abundant in the thinner upper layer. Since the natural lines of deposition were discernible the material was removed along these lines but the small number of sherds recovered probably negates any value this proceeding had. (See table 12.)

TABLE 12.—*Decorated sherds, Level A, Trench 4*

Sherd type	Basal deposit		Upper sand		Total	
	Number	Percent	Number	Percent	Number	Percent
Mesa Verde.....			2	3	2	
McElmo.....	5	39	21	33	26	34
Mancos.....	5	39	38	60	43	56
Chaco.....	3	22	2	3	5	6
Total.....	13	100	63	99	76	98

Note.—Trade types: Tusayan Black-on-red.

Level B.—This level of deposit is less well separated from Level A below it here than in the previous trenches. It was removed in one cut.

<i>Sherd type</i>	<i>Number</i>	<i>Percent</i>
Mesa Verde.....		
McElmo.....	26	55
Mancos.....	14	30
Chaco.....	7	15
Total.....	47	100

Kiva Fill, Lower.—The lower deposit with a maximum depth of 1.6 feet consisted mainly of clay chunks and scrap rock from the dismantling of the kiva down to the level of the bench. Parts of three 5-foot cuts inside the kiva are combined here.

<i>Sherd type</i>	<i>Number</i>	<i>Percent</i>
Mesa Verde.....	88	79
McElmo.....	8	7
Mancos.....	7	6
Chaco.....	8	7
Total.....	111	99

Trade types: Tusayan Black-on-red, 5.

Kiva Fill, Upper.—This represents a refuse deposit made some time after the kiva was dismantled and the upper levels of the site were occupied.

<i>Sherd type</i>	<i>Number</i>	<i>Percent</i>
Mesa Verde.....	672	97
McElmo.....	8	1
Mancos.....	5	T
Chaco.....	5	T
Total.....	690	98

Trade types: St. Johns Polychrome, 31.

Level D.—The alluvial sand, a continuation of the same level from the previous three trenches. It is somewhat thinner here. It either was prevented from entering Kiva 2 by the still standing walls or it was removed at the time the upper levels of these walls were dismantled. The few sherds recovered came from the upper surface.

<i>Sherd type</i>	<i>Number</i>	<i>Percent</i>
Mesa Verde.....	62	100
McElmo.....		
Mancos.....		
Chaco.....		
Total.....	62	100

Trade types: St. Johns Polychrome, 3.

Level E.—This is a mixed deposit at the south end of the trench, beginning just outside the south wall of Kiva 2. It is 7 feet in length with a maximum depth of 3 feet.

<i>Sherd type</i>	<i>Number</i>	<i>Percent</i>
Mesa Verde.....	164	90
McElmo.....	8	4
Mancos.....	6	3
Chaco.....	6	3
Total.....	185	100

Level F.—Level F represents the last deposition in the area prior to collapse of the walls. This is a thin layer, a continuation of Level F in the previous trenches. Maximum depth 0.7 foot. It begins against the Tri-wall and extends partly over the deposits in Kiva A and is possible an extension of them. Midway of the kiva it is cut off by an area of disturbance from the surface, (farming or the start of another root cellar). The two 5-foot cuts covering this strip are combined here.

<i>Sherd type</i>	<i>Number</i>	<i>Percent</i>
Mesa Verde.....	294	97
McElmo.....	6	2
Mancos.....		
Chaco.....	2	T
Total.....	302	99

Trade types: St. Johns Polychrome, 3; Querino Polychrome, 4.

Decorated sherds from Trench 4 (excluding trade types)

<i>Level</i>	<i>Number</i>
A.....	76
Kiva, bottom.....	111
Kiva, top.....	690
B.....	47
D.....	62
E.....	185
F.....	302
Total.....	1,473

Trench 5

Trench 5 was laid out east of Trench 4 with a width of 8 feet and cuts at 5-foot intervals. It included a portion of Kiva 2. Before work had progressed far, a third radial wall extending out from the Tri-wall was encountered. It curved through the trench and divided it. The result was that with the radial wall and the kiva both included in the trench the cuts were divided into very small segments. While the same level designations used in the previous trenches are used here the various cuts from each level have been combined. (See tables 13 and 14.)

TABLE 13.—Decorated sherds, various levels, Trench 5

<i>Sherd type</i>	<i>A</i>		<i>D</i>		<i>Kiva, upper</i>		<i>F</i>		<i>E</i>		<i>Total</i>	
	<i>Number</i>	<i>Percent</i>	<i>Number</i>	<i>Percent</i>	<i>Number</i>	<i>Percent</i>	<i>Number</i>	<i>Percent</i>	<i>Number</i>	<i>Percent</i>	<i>Number</i>	<i>Percent</i>
Mesa Verde.....	12	9	43	32	70	100	364	91	177	50	666	61
McElmo.....	53	41	66	49			22	5	138	38	279	25
Mancos.....	44	34	12	9			9	2	18	5	83	7
Chaco.....	12	9	13	9			4	1	10	2	39	3
B/Grey.....	8	6							12	3	20	1
Total.....	129	99	134	99	70	100	399	99	355	99	1,087	97

TABLE 14.—*Trade wares found in Trench 5*

Level	Citadel	Tusayan Black-on- red	Puerco Black-on- red	St. Johns	Querino
A.....	8	2	2		
B.....	5	2	1		
Kiva.....				2	
F.....				3	2
E.....		1		2	3
Total.....	13	5	3	7	5

Summary of Stratigraphic Trenches

Level A.—Level A was the first cultural deposit laid down at the south end of the Hubbard Mound. It extended northward to underlie the triple-walled structure. It was identified in each of the five trenches, and in each case rested on un-

disturbed alluvial sand. Its maximum length of 38 feet was exposed on the west side of the mound, while its extent eastward was interrupted or cut by various structures. In Trench 4 it was reduced to a length of 8 feet by construction of Kiva 2. In Trench 5 the presence of radial walls found above Level A prevented taking large continuous stratigraphic sections. The maximum depth of Level A was 3.2 feet, in Trench 4 immediately against the Tri-wall.

Level A cannot be termed strictly a refuse deposit. Rather, it was an accumulating occupation level; particularly noticeable at the west side, where it grew in depth as the bell-shaped pits there were in use. It contains numerous sandy streaks or lenses, which suggest that the deeper parts of the deposit are in large part wind or waterborne.

In addition to its value as the basal deposit, Level A showed informative changes in horizontal deposition. The table below shows these changes from the north (Cut 1) to the south (Cut 7). (See table 15.)

TABLE 15.—*Decorated sherds, Level A, all trenches (reading north to south)*

Sherd type	Cut 1		Cut 2		Cut 3		Cut 4		Cut 5		Cut 6		Cut 7		Total	
	Num- ber	Per- cent	Num- ber	Per- cent	Num- ber	Per- cent	Num- ber	Per- cent	Num- ber	Per- cent	Num- ber	Per- cent	Num- ber	Per- cent	Num- ber	Per- cent
Mesa Verde.....	7	2	8	5	7	2	16	20	11	18	13	6	5	6	67	5
McElmo.....	128	42	50	30	149	44	38	48	33	54	123	64	51	60	572	47
Mancos.....	135	45	79	47	134	40	13	16	13	21	55	28	25	30	454	37
Chaco.....	22	7	28	16	46	13	12	15	4	6	2	1	3	3	117	9
Black-on-grey.....	8	2	3	1											11	T
Red Mesa.....			1	T											1	T
Total.....	300	98	169	99	336	99	79	99	61	99	193	99	84	99	1,222	98

Mesa Verde Black-on-white is absent in some cuts in the five trenches; and its presence in small quantities in other cuts, a total of 67 sherds in this level, may be intrusive, possibly from faulty separation of the natural levels or, more probably, from later burials made into this level. The small percentage of Chaco Black-on-white, 3 to 13 percent may also be intrusive or may represent trade ware. The McElmo and Mancos Black-on-whites make up from 79 to 87 percent of all sherds in Level A. As the cuts progress southward there is a slight horizontal change in the deposition in all trenches. The Mancos sherds drop off and McElmo increases. The average of all trenches shown above is somewhat deceptive, as Cuts 6 and 7 were confined to Trench 2 alone, and some cuts were missing in other trenches, so that the totals averaged have been somewhat smoothed out. However, the averages of all cuts show that McElmo increases from a low of 30 percent at the north to 64 percent in the sixth cut taken to the south. At the same time Mancos Black-on-white with an average of 45 percent in Cut 1 at the north decreases to a low of 16 percent in the fourth cut to the south. The sherds from Trench 2 show an increase again to 30 percent at the extreme south. The overall trend is a change from Mancos Black-on-white

in the first deposits laid down to McElmo Black-on-white as the deposits increased toward the south.

In the absence of the sherds recovered from the Adobe Level rooms and of floor sherds from the adobe kiva, Kiva 3, it is difficult to correlate this basal deposit with either of the first two architectural levels at the site. While Level A was traced under the Tri-wall in places, it could not be definitely tied into either of these two architectural levels which also in part underlie this structure. Some of the Tri-wall foundations penetrate this level of construction, and excavation for the central kiva removed both the adobe construction and Level A in this central area.

In the absence of sherds definitely from the floor levels of the adobe construction—both rooms and kiva—no estimate has been made of the time interval separating the Adobe Level from the Middle Level masonry construction which followed it. It is possible that the time interval was very short. If this is true, then the horizontal change in the deposition in Level A may well represent deposition from these two architectural levels. The predominant Mancos material at the north may be related to the adobe construction, and the increasing percentage of McElmo at the south may come from the following level of masonry construction.

Sherds considered as trade wares in Level A were predominantly from the Kayenta Branch: Tusayan Black-on-red with 24, and Citadel Polychrome with 10. Together these make up 60 percent of all trade wares. They are followed by Puerco Black-on-red with 14 (or 24 percent), and three sherds each of Wingate Black-on-red and an unidentified brown ware with smudged interior.

Level B.—The 213 sherds from Level B constitute but a very small proportion of the total from the stratigraphic sections. This level was in all trenches a very sandy deposit, never extending more than 10 feet beyond the southern limits of the Tri-wall. It did, however, extend back under the Tri-wall; and perhaps if it had been possible to section the strata below this structure, Level B would have more nearly approximated Level A, on which it rested, in size and volume of sherds. From what was exposed, however, it would appear that Level B does not represent a primary deposit—a level which received continual depositions of trash. It seems rather to have been a backwash of accumulating sand and occasional trash, in a period shortly before the area was covered by the widespread alluvial deposit. It shows a slight rise in the percentage of Mesa Verde Black-on-white, an increase in the amount of McElmo Black-on-white present, and a continuing decrease in the amount of Mancos Black-on-white. Chaco hachured remains the same. Altogether it appears that conditions were essentially the same as between the latest deposits in the southern end of Level A and the deposition in Level B. If there is any trend it is a continuation of that noted in Level A, that McElmo Black-on-white is tending to become the dominant decorated ware in these lower levels. (See table 16.)

TABLE 16.—*Decorated sherds, Level B, all trenches*

Sherd type	Cut 1		Cut 2		Total	
	Number	Percent	Number	Percent	Number	Percent
Mesa Verde.....	2	1	1	3	3	10
McElmo.....	108	58	13	48	121	57
Mancos.....	56	30	12	45	68	32
Chaco.....	20	10	1	3	21	9
Total.....	186	99	27	99	213	99

Level D.—Level D is the sandy alluvial layer that covered the site following the second, or Middle Level architectural period, and presumably it marks a time of abandonment. It covered the remains of the first occupation—the adobe houses—filled the depression of Kiva 3, and stood at least 13 inches deep in the remains of the second or masonry level of construction. It also covered all of Levels A and B discussed above. This alluvial wash did not fill Kiva 2, which stood south of the Tri-wall, nor was it found in Pit X which was constructed sometime following this deposition. Level D extends some 20 feet south of the Tri-wall; it ranges from 6 inches to 1 foot in depth here. At the south end of the mound it pinches out, and where it could be traced beyond

this point in Trench 2 it was a light, sandy streak, 1 to 2 inches thick between the darker deposits.

As laid down Level D is singularly free of sherds, charcoal or other cultural material. The radial walls extending out from the Tri-wall are based in or on the upper surface of this deposit. In the vicinity of these structures and south of the bell-shaped pit-firepit complex, there was some mixing, and the sherds recovered have been assigned to this level. The sherds shown in the following totals were not distributed throughout all of Level D, but came in the main from the north end of Trench 2 adjacent to the multiple firepit and from Trench 5 where Radial Wall 3 cut diagonally across it.

Level D totals, all trenches

<i>Sherd type</i>	<i>Number</i>	<i>Percent</i>
Mesa Verde.....	110	31
McElmo.....	170	50
Mancos.....	44	12
Chaco hachured.....	23	6
Total.....	347	99

Trade types: Puerco Black-on-red, 1; Tusayan Black-on-red 2; Citadel Polychrome, 5; St. Johns Polychrome, 2.

As would be expected, these sherds show a mixture of material disturbed from Levels A and B below with sherds which were gathering on the surface of the alluvium when the intrusive construction took place. The large percentage of McElmo may have some bearing on the time of construction of the Tri-Wall. However, over an area holding the major deposits exposed in the Hubbard Site, Level D covered and sealed off a period or periods when Mancos Black-on-white followed by McElmo Black-on-white was predominant and, ignoring the 67 Mesa Verde sherds from the lower deposits as intrusive there, Level D covered the deposits laid down before Mesa Verde Black-on-white of the Montezuma phase made its appearance on the site.

Levels C and E.—The natural stratum underlying the Hubbard Mound deposits dips sharply to the south at an average distance of 20 to 25 feet south of the Triple-walled structure. In some trenches there was a slight rise at the rim of the mound just preceding this dip. Levels A and B were confined to the horizontal extent of the mound and did not continue unbroken down the slope to the south. The southern rim of the mound was then a natural dividing line in the horizontal extent of the deposits. Levels C and E represent these deposits at the south.

Level C is the lower of the two deposits. It was identified in Trenches 1, 2 and 3 but it was not isolated in Trench 4 south of Kiva 2. All deposition there is included in Level E. Where it was identified, Level C was thin, sandy, poorly stratified and appeared to be primarily wash or redeposition from higher parts of the mound. (See table 17.)

Level E is the remaining material at the south edge of the mound above Level C and to the surface or overlying wall debris. It was identified in Trenches 1, 3, 4, and 5. It could not be identified in Trench 2 where the upper level of the mound was a mass of cobblestones devoid of refuse inclusions. Level E may represent in part redeposition

during a period of construction such as the digging of the masonry lined Pit X, the firepit complex, the central kiva, Kiva 1, in the center of the Tri-wall which required the removal of old walls and presumably refuse; parts of it may date from construction of the Tri-wall itself. There are alternate possibilities and this level may not represent entirely redeposition. While the number of sherds may be too small to possess any significance, there is a noticeable change in the sherd counts in Level E from west to east. This suggests that it may be better understood as a thin band of debris along the edge of the mound growing from west to east. (See table 18 for sherd percentages.)

TABLE 17.—*Decorated sherds, Level C, all trenches*

Sherd type	Trench 1		Trench 2		Trench 3		Total	
	Num-ber	Per-cent	Num-ber	Per-cent	Num-ber	Per-cent	Num-ber	Per-cent
Mesa Verde.....	12	14	69	91	90	62	171	56
McElmo.....	36	41	2	3	43	30	81	26
Mancos.....	33	38	4	5	8	5	45	14
Chaco.....	6	7			3	2	9	3
Total.....	87	100	75	99	144	99	306	99

Levels F and G.—These represent the last refuse deposits at the Hubbard Site. The only difference between these two is horizontal. Level G was isolated only at the south end of Trench 3 beyond the cobblestone pit, where there appeared to be a change in deposition and where the wall debris was primarily cobblestone as against the sandstone detritus of the northern part of this and the other four trenches. The sherd counts are almost identical in the two horizontal levels, and what we separated in the field on the basis of horizontal differences in the type of debris now appears to be a continuum.

Level F, occurring at the north end of the five trenches, covers the alluvial deposit, Level D, and the packed occupa-

TABLE 18.—*Decorated sherds, Level E, all trenches*

(reading west to east)

Sherd type	Trench 1		Trench 3		Trench 4		Trench 5		Total	
	Num-ber	Per-cent	Num-ber	Per-cent	Num-ber	Per-cent	Num-ber	Per-cent	Num-ber	Per-cent
Mesa Verde.....	19	21	57	51	164	90	177	50	417	56
McElmo.....	51	56	39	36	8	4	138	8	236	32
Mancos.....	17	19	8	7	6	3	18	5	49	6
Chaco.....	4	3	7	6	7	3	10	2	28	3
Black/gray.....							12	3	12	1
Total.....	91	99	111	100	185	100	355	98	742	98

tional surface above it. Level F accumulated after the triple-walled structure and its adjoining radial walls were built. It did not appear to be packed and it merges with the fallen wall above it. This refuse represents deposits made either during the occupation of the Tri-wall or very shortly after abandonment, at the same time that refuse with similar sherd content was being dumped into the abandoned rooms of the Tri-wall. Whatever the time of deposition, Levels F and G do not represent heavy or long-continued trash accumulations. Level G is mixed with cobblestones but Level F is solely refuse; it was nowhere more than 0.8 foot deep and as it extended eastward it tended to fan out and become scattered.

Levels F and G totals, all trenches

Sherd type	Number	Percent
Mesa Verde.....	1,343	91
McElmo.....	77	5
Mancos.....	37	2
Chaco.....	24	1
Total.....	1,481	99

Trade types: St. Johns Polychrome, 22; Querino Polychrome, 10; Citadel Polychrome, 1; Tusayan Black-on-red, 4.

TABLE 19.—*Sherd totals, all stratigraphic trenches*

Level	Mesa Verde		McElmo		Mancos		Chaco		Black-on-grey		Red Mesa		Total	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent
A.....	67	5	572	47	454	37	117	9	11	T	1	T	1,222	98
B.....	3	10	121	57	68	32	21	9					213	99
C.....	171	56	81	26	45	14	9	3					306	99
D.....	110	31	170	50	44	12	23	6					347	99
E.....	417	56	236	32	49	6	28	3	12	1			742	98
F and G.....	1,343	91	77	5	37	2	24	1					1,481	99
Kiva 2.....	760	95	16	2	12	1	13	1					801	99
Total.....	2,891		1,273		689		235		23		1		5,112	
Percent of grand total.....	57		24		13		4		T		T		98	

TABLE 20.—*Trade wares, all trenches*

Level	Puerco Black-on-red	Tusayan Black-on-red	Wingate Black-on-red	Smudged interior	Citadel Polychrome	Querino Polychrome	St. Johns Polychrome	Total
<i>Level A</i>								
Trench 1.....	7	8	1	3				
Trench 2.....		5	2		2	1	2	
Trench 3.....	5	7						
Trench 4.....		2						
Trench 5.....	2	2			8			
Total.....	14	24	3	3	10	1	2	57
<i>Level D</i>								
Trench 1.....								
Trench 2.....								
Trench 3.....								
Trench 4.....							2	
Trench 5.....	1	2			5			
Total.....	1	2			5		2	10
<i>Level C</i>								
Trench 1.....								
Trench 2.....	1						2	
Trench 3.....						3		
Trench 4.....								
Kiva.....		5					31	
Total.....	1	5				3	33	42
<i>Level B</i>								
Trench 1.....								
Trench 2.....		6						
Total.....		6						6
<i>Level E</i>								
Trench 3.....		1				3		
Trench 5.....		1				3	2	
Total.....		2				6	2	10
<i>Level F</i>								
Trench 1.....							7	
Trench 2.....					1	3		
Trench 3.....		4					20	
Trench 4.....						4	3	
Trench 5.....						2	3	
Kiva.....							2	
Total.....		4			1	9	35	49
Grand Total.....	16	43	3	3	16	19	74	174

Ceramic Summary of the Hubbard Site

Lack of sherd material from the lowest or Adobe Level structures prevents temporal comparison between them and the lowest levels of the stratigraphic sections. The earliest levels of the refuse contained a bare majority of Mancos Black-on-white, followed even in these earliest deposits by McElmo Black-on-white. With the lack of any other demonstrable refuse, it seems safe to assume that the lowest refuse here and the earliest structures are contemporaneous, at least in part. Mancos Black-on-white was predominant at the time the adobe rooms and kiva were occupied, and McElmo Black-on-white had certainly made its appearance during this same occupation. The pottery and architecture of

the lowest levels—the adobe walls, and the presumably contemporaneous Mancos and McElmo pottery of the refuse—would seem to place the first occupation of the Hubbard Site at the beginning of the McElmo Phase, A.D. 1050–1150 (O'Bryan, 1950: 109).

While this is admittedly going somewhat far afield for a phase designation, it is at least a point of departure. The architecture of the adobe level would seem to contain elements of both the previous Mancos Mesa Phase of A.D. 900–1050 (O'Bryan, 1950: 107) and the McElmo Phase as delimited by O'Bryan. He describes architecture of the Mancos Mesa as rarely slab and adobe, or upright post construction—a unit-type community with one or two rows of contiguous surface rooms northwest of the kiva. The adobe kiva also fits his description of the kivas of this phase—circular, usually six pilasters, and rarely a southern recess.

Architecturally, we would be tempted to place the Adobe Level rooms and kiva in the Mancos Mesa Phase, except that nowhere in the site were there any levels of refuse which did not contain approximately one-half McElmo sherds. Admittedly this is assignment of a phase designation based not upon the entire range of criteria but upon one item only—varieties of painted pottery.

Due to the complexity of the sequences involved there, it is difficult to isolate comparable structures exposed in Morris' work on the La Plata. Earlier levels of some structures at Sites 39 and 41 (Morris, 1939: 53, 85–113) may be representative of the same phase of development.

What would be called (if present) "hold-over" sherds from earlier periods, such as La Plata Black-on-white and Morfield Black-on-gray, or La Plata and Bluff Black-on-red are notably lacking. What Chaco sherds there are at this level, constituting 9 percent of the total decorated sherds, are trade pieces and not local manufacture. The other trade wares, predominantly Tusayan Black-on-red and Citadel Polychrome, with smaller amounts of Puerco and Wingate Black-on-red, also point to a later date than would be consistent with an assignment to the Mancos Mesa Phase as defined and dated by O'Bryan.

The sandstone masonry walls of the Middle Level rooms and kiva fit more nearly O'Bryan's definition of McElmo Phase architecture. This was a small unit construction, a cluster of rooms north and northwest of a kiva, with walls extending out to enclose the kiva. The kiva contained a high and narrow bench with six pilasters, but it did not have a "keyhole" recess. The refuse sections which we correlate with this architectural occupation, the southern half of Level A and Level B, are those in which McElmo Black-on-white superseded the iron-paint Mancos Black-on-white, although Mancos was still represented.

Considering the almost total absence of "classic" Mesa Verde Black-on-white of the Montezuma Phase, we seem justified in limiting this Middle Level construction to the McElmo phase. This would imply a terminal date in the first half of the twelfth century. Its placement in this phase would also make it contemporaneous with the "Chaco" occupation of the West Ruin some 200 feet away, whose terminal date for this phase is also in the early part of the

1100's. There might appear to be some difficulty in considering as contemporaneous this part of the Hubbard Site (where Chaco sherds made up only 9 percent of the Black-on-whites) and a ruin 200 feet away whose pottery for this period has been described as "Chaco" and which has been often thought to have been constructed and occupied by a group of migrants from Chaco Canyon. However, Morris at a later date (1939: 205) clarifies the "Chaco" terminology:

Notwithstanding, pottery made and used by the builders of the Aztec Ruin is more Chacoese than Chaco. It is more Chaco, certainly, than anything else, but there is little of the clear white slip and the beautifully executed, narrow-line hachured patterns that are conspicuous features of the highest Chaco wares. It is representative of the black-on-white ensemble that was in general use north of the river at the time when the best wares of the Chaco center were being made, and I believe, is the result of local expression of the generalized Chaco urge far more than the direct influence from Chaco itself.

The occasional true Chaco specimens I regard as trade pieces, and the rare, pure-Chaco sites as representative of actual colonization by small groups who came in from the south. This interpretation is based principally on the fact that certainly in the La Plata Valley and, I believe, over the whole northern region, pure Chaco, Chaco-like and non-Chaco are contemporaneous.

Examination of Morris' plates illustrating pottery from "Chaco" levels suggests that the majority of what he has termed Chaco-like and non-Chaco are Mancos Black-on-white and Morfield Black-on-gray, and that the nascent Mesa Verde in Plate 292 is probably McElmo (Morris, 1939: Plates 278, 289, 290, 291, 292). Thus if we consider that the contemporary Chaco level of the adjacent West Ruin contains very little true Chaco pottery but, instead, large amounts of what we would now term Mancos Black-on-white, then the sherd content is much like these levels of the Hubbard Site. There is little to choose between the hypothesis that the occupants of the Middle Level of the Hubbard Site continued in residence during the brief "Chaco" occupation of the West Ruin, or that they abandoned the former a few years earlier and became part of the group occupying the West Ruin. In any event, the Middle Level of the Hubbard Site, below the Tri-wall, was abandoned and covered with alluvium before true Mesa Verde pottery of the Montezuma Phase made its appearance in the area.

The sherds from the Tri-wall rooms, the kiva, the related walls, and all refuse above the alluvial deposit, are predominantly Mesa Verde Black-on-white: 84 percent for the rooms and kiva and 91 percent for the refuse levels. The accompanying trade types of St. Johns Polychrome, Houck Polychrome, and Querino Polychrome also bespeak a late date for the structure. It is clear that the Tri-wall Level was

built and occupied during classic Mesa Verde times, the Montezuma Phase. Thus, this structure was contemporaneous with the re-occupation of the West Ruin, the construction of at least most of the large East Ruin, Mound F, and possibly other of the mounds on the monument, as well as other large Mesa Verde sites in the Animas Valley. This was the period of the greatest concentration of population in the area.

BURIALS FROM THE HUBBARD SITE

A total of 12 burials were recovered from all sections of the Hubbard Site. Six came from the refuse sections, two from the Tri-wall room fills, two were sub-floor of the Tri-wall rooms, and two came from the lower fill of Kiva 3. The latter two, while also sub-floor of the Tri-wall, are considered to antedate the Tri-wall construction. General condition of the 12 burials was poor and the child burials tended to be fragmentary. All were flexed to some degree. Grave goods were scarce to non-existent. Five of the burials were of adults; seven were children or infants. (See table 21.)

This very small sample can do little more than confirm the general burial practices in the area as shown by the 186 burials Morris recovered from the West Ruin (1924: 225, chart). Morris found almost identical conditions of flexure, orientation, and percentage of accompanying grave goods. Of all burials to which he was able to definitely assign a period, he attributed only 6 or less than 4 percent to a "Chaco" period with the remainder as being of Mesa Verde age. At the Hubbard Site, the two burials deep in the fill of Kiva 3 and two from the refuse, one of these accompanied by a Mancos bowl and the other by a McElmo bowl, may be assigned a comparative age. The remaining 8, either from the associated pottery or their subfloor position in the Tri-wall, can be attributed to Mesa Verde—the Montezuma Phase.

Morris' statement (letter of November 12, 1946) that J. S. Palmer in clearing one of the rooms in the Tri-wall encountered skeletons sprawled on the floor accompanied by Mesa Verde pottery suggests that there were probably other above-floor burials in the remaining eight rooms cleared for root cellars. Morris (letter of November 12, 1946) also found above-floor burials accompanied by Mesa Verde sherds in Mound F, another apparent triple-walled structure on the monument.

TABLE 21.—*Burials from the Hubbard Site*

Number	Child	Adult	Flexed	Room	Kiva	Refuse	Associated artifacts
1.....	X		E-W			X	Awl, McElmo bowl, culinary jar, projectile points
2.....	X		E-W			X	Mancos bowl, projectile points
3.....		X	N-S			X	undecorated bowl
4.....		X	N-S			X	none
5.....		X	N-S	#4, subfloor			none
6.....		X	E-W		fill		none
7.....		X	N-S		fill		none
8.....	X		N-S			X	Mesa Verde mug
9.....	X		N-S?			X	Mesa Verde bowl fragments
10.....	X			#4, subfloor			none
11.....	X			#16, fill			Mesa Verde bowl, bone awl
12.....	X			#16, fill			Half a Mesa Verde bowl

MINOR ARTIFACTS

Chipped Stone (Fig. 45)

There are 16 whole or fragmentary small projectile points and three blades, all recovered from the later work at the Hubbard Mound, which are available for study. In addition, one broken blade and one drill found in the June and July excavations had been catalogued but were not available at this writing.

Small Projectile Points, Side-notched.—Of the 16 small projectile points 13 are sufficiently whole to classify. Twelve of the 13 can be classed together in the broad category of side-notched points. Beyond this the classification becomes a trifle arbitrary when fitting them into established groupings. Kidder (1932: 13–24) describes and illustrates from a wealth of material (1,190 pieces) a series of ten classes of chipped points and knives. The bulk of the Hubbard material does not fit readily into any of these classes, though with some forcing most of the small projectile points might be placed in his Class 3a, of expanding stem, wider than the shoulder. (Kidder, 1932: Fig. 4). Morris (1939: Plate 122) illustrates projectile points very similar to eleven of ours and these he has classified as "triangular points, stem wider than shoulder, thin and slender". Woodbury (1954: 124–126, Figs. 25, 26) follows the same general scheme, breaking side-notched points into:

1. Stem wider than shoulder
 - A. Straight-based
 - B. Concave-based
 - C. Notched-based
2. Stem narrower than shoulder
 - A. Wide-based
 - B. Narrow-based

I have wished for a classification of "side-notched, stem about the same width as shoulder." After examining with some frustration, 10 of the small side-notched points I measured all 12 in this class with the following results:

Less than 1 mm. difference between stem and shoulder.....	6
Stem narrower.....	3
Stem wider.....	2
Stem chipped, not measured.....	1
Total.....	12

In the last of these the line of the triangular sides extends to the base and though one side is chipped it is evident that the maker intended to continue the triangular shape of the blade on into the stem. This is a stem definitely wider than shoulder.

In two other points, both very poor specimens as to material and workmanship, the base is definitely narrower than the shoulder. This leaves nine projectile points where the relation of the stem to the shoulder cannot be determined without the use of calipers and where in six instances the difference is less than a millimeter. Judging from the illustrations in Morris and Woodbury I suspect that these points would be classed as "stem wider than shoulder."

However, the stems are fairly long and it appears that the maker's intent was not to continue the triangular shape of the

blade out to produce a stem with the same width as the shoulder and with parallel sides. The bases of these parallel sided stems are straight to slightly convex. The two points in which the stems are definitely narrower than the shoulder have slightly convex bases.

These two points with bases narrower than the shoulder both show poor material and workmanship. One is from a chip of earthy jasper; its length is 2.1 cm., the width 1.1 cm. The tip of the other point is broken but it has a probable length of 2.6 cm. and a shoulder width of 1.3 cm. It is roughly shaped from a thin chip of chalcedony and much of the original shape of the chip remains. Both of these poor points were found with Burial 1 in the refuse sections.

The one side-notched point with the stem continuing the triangular shape of the blade so that it is definitely wider than the shoulder, is of jasper. The length is 2.7 cm., the width at the shoulder 1.4 cm. It came from clearing debris at the south end of the mound.

Of the nine points with side-notches and parallel stems, the longest three are approximately the same size, with lengths of 3.9 cm. and shoulder widths of 1.3 cm. and 1.4 cm. One is chalcedony, one jasper and one fine quartzite. Two are from the lower refuse, Level A, and one is from the refuse level of Kiva 2.

The remaining 6 points with side notches and parallel stems range in length from 2.7 cm. and shoulder widths of 1.3 cm. to a length of 2 cm. and a shoulder width of 1.1 cm. They are a quite uniform group. The materials are three jasper, one chalcedony, two fine quartzite. Two are from the upper levels of the refuse, Level F, one from the floor of Kiva 2, one from Burial 2, in Trench 2, and two from clearing mixed debris at the south edge of the mound.

Of the three fragmentary points not described above, one is jasper, two are chalcedony. Two are from Level A of the refuse deposits and one is from the latest refuse, Level F.

Small Projectile Points, Diagonal-notched.—There is one broken example of this class, made of obsidian and similar to Morris' "triangular points, straight stem (1939: Figs. 125, 126) and Woodbury's "slender, barbed, diagonal-notched points" (1954: Figs., 25n. and 26n.). This obsidian point is very well made. Part of the stem is broken; the remaining length is 4.5 cm. and the greatest width 1.5 cm. It came from the refuse, Level A.

Blades.—There is one complete stemless blade and fragments only of two larger blades, probably knives. The complete blade is jasper, not well fashioned. A small part of the tip is missing. The length is 3.6 cm., the width 1.7 cm. It resembles in form Kidder's "Stemless, subtype C" and Woodbury's "Symmetric stemless, straight base" (1954: 122). It is from the refuse, Level B.

The two fragments are parts of large, well chipped, and heavy blades, undoubtedly knives. One is chalcedony, the other a fine quartzite. The maximum remaining widths are 2 and 2.5 cm. and both were recovered from the lowest refuse, Level A.

Other Chipped Stone.—The fragmentary blade recovered during the June and July excavation under Onstott and not ex-

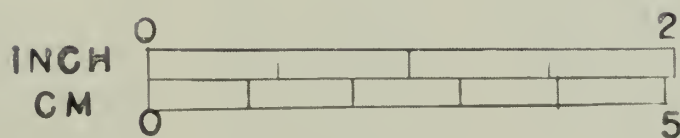


FIGURE 45. Chipped implements: b and c, side-notched with stem narrower than shoulder; e to j, parallel stem about the same width as shoulder; n, diagonal-notched; k and l, fragments of large blades; m, a complete small stemless blade.

amed here came from the Tri-wall Room 16 and the drill from subfloor, Room 15A.

Distribution.—Woodbury (1954) has brought together a vast quantity of comparative data on the distribution of kinds of chipped points in his study of the Awatovi stonework. The collection at hand while too small to offer much in the way of further comparison appears to fit most nearly the category of small side-notched points which he refers to as the La Plata variety (1954: 126). They fit this and Morris' description and illustrations of the La Plata material (1936) and also the type of point which Morris found to be predominant in the Aztec Ruin (the West Ruin) far more closely than they resemble Woodbury's Awatovi style of side-notched points wherein the typical example has a notched base. O'Bryan illustrates from Mesa Verde side-notched points with a wide variety of stems (1950: Plate 28).

In this small collection there is only one side-notched point which resembles the Pecos variety where the stem continues the triangular line of the sides of the blade.

The one slender, diagonal-notched point, from the lowest refuse levels appears to be out of context. Both Bohannon (1939: 90-93), working in the Chaco, and Woodbury note that this type is relatively more numerous in earlier sites. Bohannon limits its occurrence to Basketmaker III and Pueblo I levels while Woodbury notes that it is relatively more numerous in Basketmaker III and Pueblo I and II in the Jeddito area. In the Mesa Verde this type appears confined to the Chapin Mesa Phase (O'Bryan, 1950: 82).

Of some interest is the distribution of the chipped stone within the site. Including the material recovered earlier, there are a total of 21 whole and fragmentary chipped implements. Of these the two poorest, by a wide margin and which resemble rejects more than useable points, were found with a child burial. One additional point came from a child burial. Both of these burials were in the refuse on the south side of the mound.

One broken blade came from Room 16, the only chipped implement found within a room. The drill was from sub-floor of Room 15A which would place it in the lower refuse levels, at least those pre-Tri-wall. One came from the top refuse in Kiva 2 and one from the floor deposits of this same kiva. The remaining fourteen chipped implements came from the refuse outside the Tri-wall to the south. Of the 14, 7 are from the lowest level, Level A, associated with the Adobe structures; one is from a middle level, three are from mixed deposits or clearing operations, and three are from the upper refuse associated with the Tri-wall structure.

Ground and Pecked Stone

Axes (Fig 46).—There were a total of 18 stone axes recovered from the Hubbard Site. Of these, 14 came from the June and July excavations in the Tri-wall rooms and the remaining 4 from later work in the refuse deposits. However, out of the total only nine were available for examination. These nine axes are all full-grooved or side-notched. They are in general a rough lot, made from quartzite cobbles and modified only sufficiently to serve the purpose. They vary

considerably, ranging in lengths from 12 to 22 cm. and in weight from 1.5 to 4 pounds.

One of those catalogued but not examined was described as double-bitted. One of the nine examined is also double-bitted. The remainder are single-bitted. Since there is considerable variation in size and shape, each is described briefly. (nomenclature is after Woodbury, 1954: 25, 26, Fig. 4)

1. Single-bitted, length 19 cm., width 7.5 cm., thickness 5.5 cm. Well made; the entire implement is polished; the bit is sharp and in good condition; the poll shows no use as a hammer.

2. Single-bitted, length 17.5 cm., width 10 cm., thickness 3.5 cm. This is a barely modified cobble. It is triangular with the bit, only 4 cm. wide, at the narrow end. The surfaces above the bit are not modified by polishing and the groove is shallow and roughly pecked. The poll shows slight use for pounding.

3. Single-bitted, length 12 cm., width 8.6 cm., thickness 4 cm. The bit is slightly battered but serviceable. The poll shows use for pounding and one side is broken away. Whether this occurred in the cobble before manufacture or in use is difficult to say. The bit shows some polishing as far back as the groove but above this there is no modification of the original stone. The groove is deep and well made on one face and two sides, but is barely indicated on the other face.

4. Double-bitted, length 13.5 cm., width 8.5 cm., thickness 4 cm. This ax shows secondary use for pounding on both bits. The surface is now very rough and pitted but some spots show enough polishing to suggest that the entire axe was originally polished. The groove is deep, particularly on the sides.

5. Single-bitted, length 16 cm., width 9 cm., thickness 5.1 cm. The piece shows little modification from the original cobble. The bit is roughened; one side shows deep abrasions while the other side retains the unmarred polish. The poll is battered and chipped. The groove is well made on two edges and one face and runs out to the smooth face on the other side.

6. Single-bitted, length 22.8 cm., width 10.6 cm., thickness 5.1 cm. This ax is badly battered. The bit is split away on both faces and the poll is battered. Much of the surface, particularly the sides show deep pecking, presumably from manufacture. The groove is deep on the two edges and one face; it runs out to the surface in the center of the other face.

7. Single-bitted, length 16.1 cm., width 5 cm., thickness 4.4 cm. This is an almost square ax, badly worn. The bit and poll are battered. Originally most of the surface seems to have been polished. The groove is deep on two sides and one face and runs out on the other face.

8. Single-bitted with notches on the sides rather than grooves. The bit is broken at approximately half its length. The ax is quite thin and the poll shows no battering. There is no indication of polishing, pecking or other modification of the original cobble on the portion that remains. Length 12.7 cm., width 8.3 cm.



FIGURE 46. Axes and maul: c is 22.8 cm. long, weight 4 pounds; j is the one maul in the collection.

9. Single-bitted, grooves on both sides which extend nearly across the faces but do not quite meet. The bit is broken and this crude implement may have been a maul rather than an ax. Aside from the groove there is no modification on the remaining piece. Length 13 cm., width 7.3 cm.

Maul.—The original cobble is unmodified except for a shallow groove which encircled it except for a space of 3.5 cm. on one face. It shows only slight abrasions at either end. Length 17.6 cm., width 6.9 cm.

Discussion of Axes.—The general impression gained from these axes and the maul is that they were carelessly made from whatever cobbles were at hand. The plates illustrating Woodbury's Awatovi axes (1954: Figs. 14, 15) suggest much better workmanship there and bear out the impression of crudity here. These also appear to be heavier in general. Certainly they are much larger than the Awatovi specimens. The average length for the Hubbard axes is 15.9 cm., the minimum 12 cm., and the maximum 22.8 cm. against Awatovi figures of 9.5 cm., 5.7 cm., and 17.1 cm.

The Hubbard pieces resemble more closely Morris' "Later" La Plata examples (Morris, 1939: 135, Plates 157-162). He notes that the La Plata axes were made from waterworn boulders found in river drift; and he says of them, "While some of the specimens are neatly and carefully shaped and fairly well polished, especially between the notch and blade, there are few that could be considered beautiful in themselves. Thus they are in marked contrast to those from some other portions of the Southwest."

Morris also recovered 50 axes from the Aztec Ruin (1919: 22). Of these 45 were single-bitted and 5 double-bitted. Twenty-three had continuous grooves through the edges only.

At Mesa Verde, O'Bryan (1950: 84, Plate 30) notes that axes with either a side-notch or full-groove for hafting were found at all ruins except Site 45. The axes of the Chapin Mesa Phase appear to be restricted to the side-notched variety and these showed a minimum of alteration from the original cobble. In sites later than the Chapin Mesa Phase the full-grooved style was the rule.

The battered fragments of axes from Site 16 at Mesa Verde (Watson and others, 1950: 63, Plate 38) were both side-notched and full-grooved and the latter resemble closely the examples from the Hubbard Site.

In general it could be said that the Hubbard axes are characterized by poor workmanship, large size, little if any modification of the original cobble above the groove, polishing confined in the main to the bit, and grooves which tend to disappear on one of the faces.

Provenience of Axes.—Here all 18 catalogued specimens and the maul are considered. Eight came from the refuse deposits in Tri-wall Room 2, three from the thin refuse in Room 3, two from refuse in Room 16, one from the floor of Kiva 1, one from the subfloor of Room 18, and four from the refuse sections—one from Level A at the bottom, two from Level C near the middle and one from Level F, the last deposit.

Thus all of these eighteen axes and the maul, except in three instances, can be attributed to the Tri-wall, Montezuma Phase Levels, probably late in the occupation when some of the Tri-wall rooms were being used as refuse dumps. The recovery of so many axes from these rooms is somewhat in contrast to the finds of projectile points.

Stone Bowl.—One small stone bowl came from the floor of Kiva 1, west side. The material is rather coarse grey quartzite, quite well finished on both exterior and interior. Outside dimensions are height 4.3 cm., diameter 7.8 cm., diameter of bowl interior 4.7 cm., depth of interior 2.5 cm.

Manos and Metates.—There were no manos or metates found in the later excavations of the stratigraphic sections. During the original excavations in June and July 1953, Onstott recovered 33 whole or fragmentary manos and 3 broken metates from the thin refuse deposits in Rooms 1, 2, and 3. The metates were described as of slab form.

Worked Bone and Shell (Fig. 47)

There were a total of 88 identifiable bone and shell objects catalogued from the Hubbard Site. Of these, 56 pieces, or that part of the material recovered during the first phase of the excavations in June and July 1953 were not available for study. The available material consisted of 16 awls, 6 awl fragments not classified, 4 bone tubes, 2 scrapers, 1 rectangular bone counter and 3 pieces of shell. This is a comparatively small group that by its restricted nature does not lend itself to any extended classification. As Whittemore has said after an extensive distributional study, the differences in bone tools, particularly awls, do not bulk very large even when considered by different cultural periods over wide areas: "Awls are, in general, rather similar because material and functional restrictions make this almost inevitable" (1939: 146). Judd (1954: 143) after studying 417 awls from Pueblo Bonito remarked, "They are just awls and they were made out of whatever suitable material was available."

Kidder's classification (1932: 195-272) based essentially on the type of bone and the amount of modification from the original shape, is followed here.

Awls, Head of Bone Intact.—There are six specimens in this group. One is of mammal bone, a cervid ulna. It is a blunt instrument with the point approaching chisel shape. It bears no abrasion marks at the point and might be classed by some as a flaker rather than an awl. The other five awls in this class are of bird long bones. In each case the head remains unaltered and shows some polishing through use. None of these awls appear to have been sawed or ground to length; instead they were roughly splintered and then ground to a point. Four have long, tapering points; the fifth is blunt and has a pronounced shoulder.

Awls, Split Mammal Bones, Heads Modified.—There are seven in this class of split mammal long bones and they exhibit a considerable range for so small a group. The longest is a well made instrument 16.3 cm. in length; the shortest is a blunt tool 7.1 cm. long. The longest and best formed of these tools show faint grooves "weaving ridges" near the



FIGURE 47. Bone awls from the Hubbard Site.

center. In four the butt ends have been squared up slightly by grinding. On the remaining three the heads are slightly rounded.

Splinter Awls.—There are three of these short, sturdy tools of mammal bone all between 6.6 cm. and 8.2 cm. in length.

Humerus Scrapers.—There are two, almost identical in form, each 12.5 cm. in length and well polished through use.

Bone Counter.—This is rectangular, 1 cm. by 1.5 cm. and 2 mm. thick. It is well smoothed. One surface is flat and the other bears a deep groove running lengthwise which has nearly severed the piece in two. There are no other marks on the surface such as are frequently found on dice or counters.

Bone Tubes.—The 4 bone tubes, 1 of them broken, range in length from 6.2 cm. to 11.7 cm. There is no uniformity. The shortest has the greatest diameter; the next shortest has the smallest diameter and the remaining two are long, one of small and the other of large diameter.

Shell.—There is one small fragment of a shell bracelet, one olivella shell and a small "saucer-shaped" bead which has a hole drilled through it somewhat off center.

Provenience.—Although not all available for examination, the provenience of all 88 pieces of catalogued material can be established. The provenience of all worked bone and shell is given, whether it has been described or not, in the following list:

Lower refuse, stratigraphic sections	7
Middle Level refuse, stratigraphic sections	6
Upper refuse, stratigraphic sections	5
Burials	2
Room fills	39
Kiva 1, fill	13
Kiva 2, fill	6
Rooms, subfloor	6
General digging	4
Total	88

Thus the bulk of the bone and shell material can be attributed to the latest occupation of the site, since 64 percent of it came from either the Tri-wall rooms, Kiva 1, or the upper

refuse levels. Thirteen percent is from Middle Level refuse and 14 percent from earlier refuse. The remainder is scattered or from general digging. Awls seem to be left in room refuse more often than they are placed in exterior refuse. Morris (1919: 39) records 248 awls from room fills in the Aztec Ruin; Judd (1954: 141) found 417 whose provenience he lists as "dumps" 75, rooms and kivas 85, unknown 57, and "trash" 200. I assume that "dumps" refers to refuse heaps outside rooms and that "trash" means room fills as opposed to those found on room or kiva floors. Pepper (1920: 366-368), for the same site, lists 385 awls from rooms.

Comment on Artifact Distribution

While this brief summary of the smaller artifacts, particularly the stonework, tends to show some distinctive features when it is compared with extremes at the east and west of the Pueblo area, Pecos and Awatovi, and not necessarily always at the same cultural level, it does not appear to indicate differences within the levels of the site itself. Of the material recovered only one chipped implement was found within a room. The remainder came from the refuse; and of these, half were in the earlier levels. On the other hand the ground and pecked stone material, axes, manos and metates, and the stone bowl came primarily from room deposits and were late in the life of the site. Likewise the bonework—most of it came from rooms and was late.

It is possible that there was some differentiation in the disposition of discarded artifacts—chipped implements thrown outside; awls, axes, and manos and metates tossed into an abandoned room. On the other hand it would require the excavation of a complete site and all the surrounding refuse dumps to determine if this had any validity. The Hubbard Site is hardly a good example. There were at best only portions of three of the earliest rooms and one kiva excavated. There were only parts of floor areas and one kiva distinguished in the Middle Level of construction, while there were 22 rooms and a kiva of the latest period cleared.

The Tri-wall Structure at Pueblo Del Arroyo, Chaco Canyon

BACKGROUND

This triple-walled structure is in Chaco Canyon National Monument in northwestern New Mexico. The ruin lies in the southwest quarter of Section 12, Township 21 north, Range 11 west. Since this is a brief report on a rather second-hand ruin, any description of the general area would be superfluous to the student of Chaco archeology who is at all familiar with the country through the various writers from Holsinger to Kluckhohn. The student not so familiar should consult Brand (1937: 18-67) for the most comprehensive and authoritative discussion of the Chaco: The history of research there, the geology and land forms, the climate and water supply, and the natural resources.

The report on this structure is based upon what might well be called a project of salvage archeology. This site, the three-walled circular building and its attached kivas and rooms, was originally trenched and partially cleared in 1926 by The National Geographic Society's Pueblo Bonito Expedition. It has remained unpublished since. In the 24 years following this partial excavation and up to the date of this work, (1950), the site became a rather shapeless mound with the central depression extensively cut by the rapid runoff of surface water.

This group—the Tri-wall and adjoining structures—is attached in part to the west side of the classic Chaco site of Pueblo del Arroyo, and it was considered an integral part of that ruin under the National Park Service stabilization program. Since this triple-walled structure is unique in the Chaco area at least, and since none had been fully reported upon, it was felt that its preservation would add at least an architectural chapter to the interpretive program. And it was further hoped that it might be possible to salvage some pertinent data on its age, usage, and affinities, which might not have been recovered in the so far unreported examination of 1926.

Plan (Fig. 48)

The Chaco building is a triple-walled circular building 73 feet in outside diameter. It is joined on the south by various attached rooms and kivas, of which 11 rooms or small areas and 5 kivas were cleared under the work reported here. These, together with the Tri-wall, lie on the west side of Pueblo del Arroyo, and some of the room walls are attached to that structure. These are but the remaining parts of a once large community which encompassed the west and south sides of

Pueblo del Arroyo. Walls may be traced southward for a distance of 115 feet and thence eastward along the south wing of del Arroyo for 90 feet. Surface erosion and arroyo cutting have removed all but traces of these latter walls, as well as the western extremity of the Tri-wall itself. On the basis of the average size of the rooms that remain, the original house block of the Tri-wall community contained from 70 to 80 rooms.

Previous Examination

The National Geographic Society Expedition to Pueblo Bonito conducted excavations in Pueblo del Arroyo proper during the seasons of 1923, 1924, and 1925, clearing approximately three-quarters of the site (Smithsonian Miscellaneous Collections, Vol. 78, No. 1, *Explorations and Field Work in 1925*: 80-88). In 1926 explorations were carried on in the buildings under consideration. The references here are again limited to a brief note in the Smithsonian Miscellaneous Collections (*Explorations and Field Work in 1926*: 126). In this reference the structure is referred to as a tower.

Our preliminary survey of the ruin indicated that the structure had been extensively trenched but only a few rooms completely cleared. The site at the beginning of our 1950 work had this appearance:

Within the circular building:

1. A shallow depression at the center with two isolated blocks of fill at the south, indicating that most of the center had been cleared to a depth of some 3 feet.
2. Parts of Rooms 01 and 08 were exposed and had been fully excavated.
3. A trench 2 to 3 feet wide and 3 to 4 feet deep ran through the center of Rooms 03, 04, 014.

Outside the circular building:

4. Kivas AA and BB had been partially cleared. A portion of Kiva EE was exposed as was one wall of Room 012.
5. Junctures of some of these room walls with the west wall of Pueblo del Arroyo could be seen above the general fill level.

Clearing of the site showed further that:

6. At least half of the outside circumference had been trenched in 1926.
7. Debris from excavations in the interior had been thrown in these outside trenches and piled on unexcavated areas.

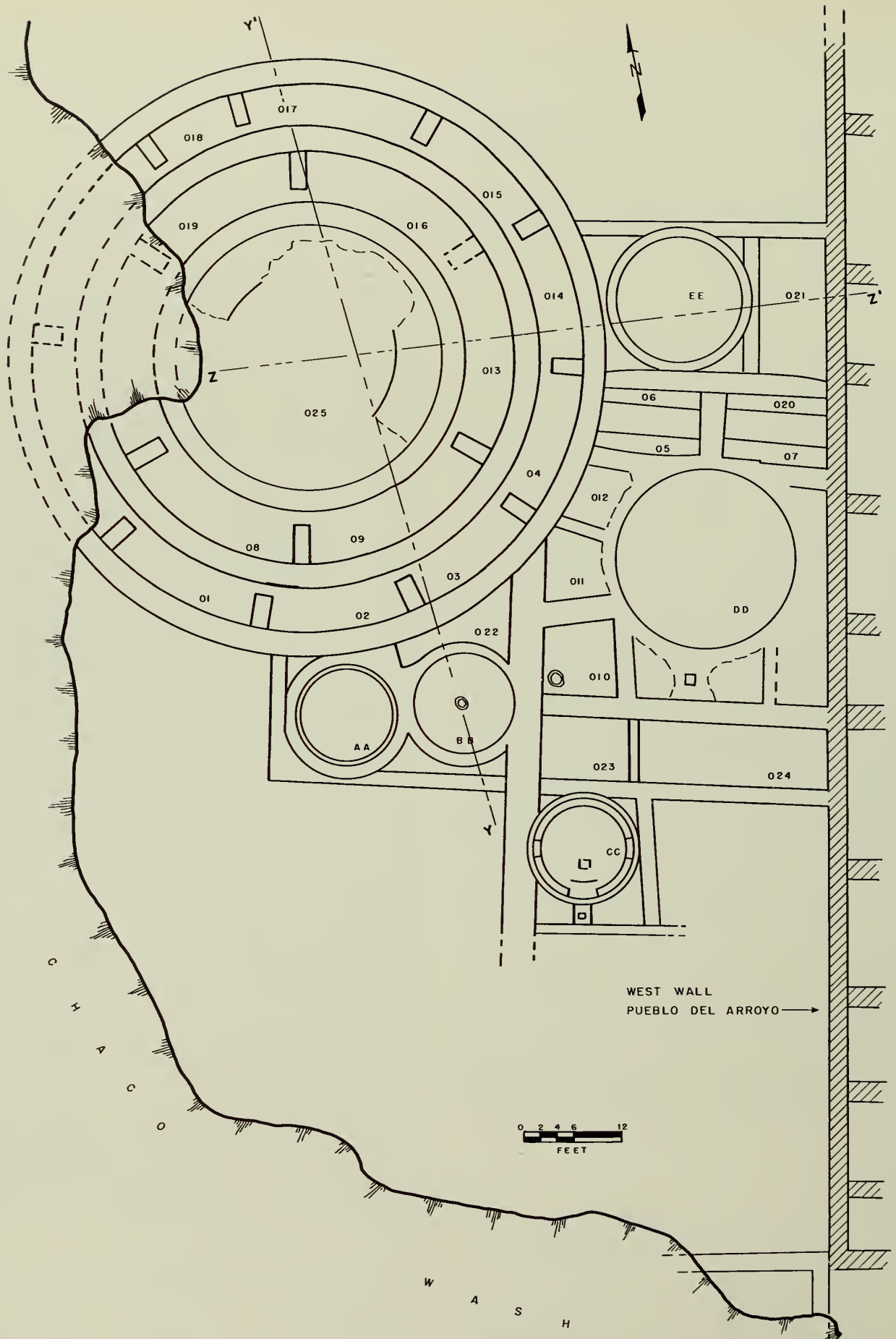


FIGURE 48. Ground plan of the triple-walled structure at Pueblo del Arroyo. The Tri-wall group is attached to the west exterior wall of Pueblo del Arroyo and lies between it and the Chaco Wash.

Fill: Tri-wall Structure

Though out of the usual order it seems pertinent to say here, before discussing the architecture, that the site gave every indication of having been robbed of its faced building stone in prehistoric times. The walls were very heavy, from 2 to 3½ feet thick, and the trimmed and faced stone was but a thin veneer on each side of the wall.

In salvaging the building for trimmed stone, the thin veneers were simply pulled away from the massive core of adobe and scrap rock and this core left standing. Within the center of the circle, most of the inner wall facing was removed to floor level. The middle and outer walls were not stripped to quite this depth and are fairly uniform in height, with the exception of one block of middle wall at the east side. There were no deposits, and indeed very few single pieces of fallen veneer, in the fill to indicate that there was any considerable time interval, either between the abandonment of the building and its razing or between the beginning and the completion of this salvage.

The fill then, except for very thin lenses of ash and refuse on some floor levels within the circular structure, was composed entirely of the decayed cores of the walls. This made a very compact and dense material; the material

within the rooms could be told only with difficulty from the original core of adobe and scrap rock still in place over the stub walls.

There were thin lenses of ash and refuse on the floors of Rooms 02, 03, and 04. The remainder of the rooms were without refuse deposits and what sherd material was recovered came from floor levels.

ARCHITECTURE

The Tri-wall (Fig. 49)

In plan this triple-walled building is almost identical to that at the Hubbard Site except that the rooms are far more narrow and there may have been no central kiva. There are three concentric circular walls. Partition walls between them divide the 2 rings into a series of rooms, 6 in the inner circle and 10 in the outer. The center of the structure, at least when cleared, was an open circular area 21 feet in diameter. Around the edge of this area and against the innermost wall are portions of a flagstoned walk 6 feet wide. Though only parts of it remain at the northwest and southeast, it probably was originally continuous. The central



FIGURE 49. The triple-walled building and associated structures, looking south. Remains of the associated rooms and kivas, some of which were trenched in 1926, may be found as far south as the island in the middle foreground. The west wall of Pueblo del Arroyo is at the extreme left.



FIGURE 50. A cross section of the highest standing wall. Note that there is very little stone in the heavy core.

area is at present one foot below the level of the floors in the remainder of the structure. While there are no floor or kiva features in this area at present it is possible that they were removed when the building was razed for the stone. We recall that except for the bottom of the ventilator shaft in Kiva 2 at the Hubbard Site the firepit and any other floor features were missing. Not even the floor surface could be determined. Lancaster and Pinkley (1954: 80) remark on the thoroughness with which buildings had been stripped of construction materials at Site 16 on the Mesa Verde. The extreme west side of the Tri-wall is missing here and this central area drained out through it to the Chaco Arroyo. If any floor or occupational surface was present here it has long since been destroyed by erosion in the years following its exposure.

All masonry within the triple-walled structure is similar—very heavy walls ranging from 2.5 to 3.5 feet in thickness. All is rubble cored, the core containing more than the usual amount of adobe mortar, and a thin facing of dressed stone. The three circular walls each extended below the floor levels 1 to 1½ feet and there is no discernible base or footing as at the Hubbard Site. The partition walls rest upon the floor level. The facing of this masonry is of large blocks of soft amorphous sandstone with the exposed faces well dressed by pecking. These blocks are separated by thin rows of spalls. The spalls were placed from the exterior after the blocks were laid and the blocks do not bear on them. Remaining wall heights range from mere indications to 5 feet.

Rooms (Figs. 50, 51).—Of the six inner row rooms, four and a half remain intact. They average 14 feet long and are 4.5 feet wide through the centers. Between the middle and outer walls, 8 full rooms remain out of a probable 10. Of these, eight are 10.5 to 12.5 feet long and 3.5 feet wide. The ninth is 6.5 feet long. The partition walls in all rooms abut against the circular walls and, since they rest on top of the floor level, it would appear that the same sequence of construction obtained here as at the Hubbard Site, where the circular walls were finished and plastered before the erection of the partition walls.

There were good, single floor surfaces in Rooms 09, 013, and 016 in the inner circle. Each was a single, sandy layer .01 to .02 foot thick showing considerable use and scattered lens of ash and refuse. Remaining floors in the outer group were fairly distinct with occasional thin ash lens resting directly on them.

Openings (Fig. 52).—Portions of doorways remained in four rooms; they were more or less complete except that none extended to their total height. They show unusual construction. The partition wall in each case stops just short of the circular wall and the doorway is this space between the partition and circular walls. They are 1.5 feet in width; the tread is 1.3 feet above the floor. There are no indications anywhere in the building of doorways or other openings through the circular walls, either between rows of rooms, to the exterior or to the central interior area.

Associated Structures

All of the structures joining the Tri-wall cleared in this 1950 work were of cored construction; wall widths averaged 2 feet. This is somewhat lighter than the construction of the circular walls. In surface finish, while the spalling is somewhat more sparse and the blocks more regular than in the triple-walled portion, it would be difficult to distinguish between the two. The surface is of large blocks of amorphous sandstone. The exposed faces of the stone have been dressed by pecking or rubbing. The blocks do not bear on the random spalling, and this spalling is usually held in place by gobs of mortar.

The nine rooms and a kiva against the south wall of Pueblo del Arroyo dug in 1926, which belong to this same Tri-wall group, hold some thin masonry which is not cored though the surface finish is the same.

Sequence (Fig. 53).—The foundations of the associated rooms do not rest upon undisturbed adobe hardpan as do both the west wall of Pueblo del Arroyo itself and the walls of the circular triple-walled building. The walls of the associated rooms are somewhat higher than both, and are laid on a sand deposit (see profile of site, Fig. 54).

The western part of Pueblo del Arroyo proper and the triple-walled building rest on very nearly the same ground surface—a very dense and impervious adobe stratum. We assume that the following construction sequence obtained:

A. Pueblo del Arroyo proper was in use for some time before the triple-walled building was erected. During this time interval some 6 feet of soil was deposited against the



FIGURE 51. Room 03 in the outer ring. Walls in the background are of adjoining Kiva BB and Room 022.

west side of the pueblo. The bottom strata were in the main adobe and as the deposit increased the upper layers became more sandy.

B. When the triple-walled building was constructed an excavation was made, kiva fashion, through the sandy layers to the adobe, and the walls were based on this layer, still some 2½ feet above the lower floor levels of Pueblo del Arroyo.

C. The associated rooms and kivas were then built, the kivas also being sunk to this adobe level while the rooms were laid over the sand deposit.

D. There was little if any time interval between construction of the central triple-walled building and the associated structures.

The most unusual construction feature is the bonding of these later room walls into the west wall of Pueblo del Arroyo itself. In four instances, the facing on the exterior of the pueblo was removed and the later walls bonded into it. In one case too much of the del Arroyo facing was removed and the patch was made, not with the hard laminated stone of the original construction, but with soft amorphous stone like that in the addition. This unusual removal of the facing to construct a bond was certainly not required to strengthen the low walls of the addition. This same type of construction with the distinctive, light-colored amorphous stone can be observed in late remodeling and the filling of doorways in Pueblo del Arroyo. Both the stone and the masonry style vary from that employed in the original construction.

Kivas.—Of the five kivas cleared in 1950, only one had not been previously excavated in part.

AA. The west one-third remained undisturbed.

BB. Fully excavated in 1926.

CC. Possibly partly excavated in 1926 but a heavy sherd layer was found embedded in and below the floor level.

DD. Razed in prehistoric times. Only the bare outlines remained at floor level.

EE. Previously undisturbed.

Omitting DD, about which we are uncertain, all four kivas were circular; there were no keyhole shapes. Beyond this they varied considerably. The most notable exception is CC, which had nothing to recommend it as a kiva except that it was round. There were no bench, firepit, deflector, ventilator shaft, or other floor features.

The three remaining kivas, AA, BB, and EE are essentially similar in plan; small, with an average diameter of 12 feet. There were relatively high and narrow benches in AA and EE, while insufficient height remained in BB to determine bench proportions. All three contained above-floor vents and basin-shaped firepits. There were slab fire screens in two, AA and BB, while EE had a raised masonry screen incorporating small vertical poles. Kiva EE also contained two small masonry pilasters, one each on the east and west sides.

As far as kiva size and style go, the three examples here do not fit the pattern of typical Chaco kivas of the classic



FIGURE 52. Detail of masonry and doorway in Room 03.

period. The typical kiva of Pueblo Bonito, del Arroyo, Chetro Kettle, etc., is large, has a low bench, vestigial log pilasters on the bench, a slab fire screen, and subfloor ventilator. With the exception of the two slab fire screens, none of these traits are encountered here. Benches are high and narrow instead of being low and wide; there were no log pilasters, only one masonry fire screen, and all three ventilators were openings through the wall instead of being subfloor trenches.

In plan the three kivas most nearly resemble those of the small sites Bc-50 and Bc-51 excavated by the University of New Mexico in Chaco Canyon. Kluckhohn has suggested that those sites were also occupied during the classic period in the Chaco but by migrants from another, perhaps northern area (Kluckhohn, 1939: 151-162).

Within the 2 sites Bc-50 and Bc-51, 10 kivas have been cleared. (Kluckhohn and Reiter, 1939: 34-39; Hibben in Brand, Hawley, and Hibben, 1937: 73-79). Of the 10 examples 5 were round, 5 keyhole-shaped. Nine had above-floor vents and only one a subfloor shaft. Three were without deflectors of any kind and of the remaining seven, six had masonry fire screens and one, that with a subfloor ventilator, a slab screen. Pilasters were present in only 3 out of the 10 examples.

While Kluckhohn has remarked that one of the most noteworthy facts about the Bc-51 kivas is their great variety

of architectural features (1939: 39), there still appears to be a marked similarity between them and those of the triple-walled unit. This similarity is most evident in (1) size, (2) bench proportions and (3) the above-floor vents.

Dutton cleared two and a half kivas at Leyit Kin, another small ruin in Chaco Canyon; two were circular and had four and six pilasters, respectively; one completely cleared had a subfloor shaft (no data on deflector). The third kiva was of the keyhole variety, with four pilasters, subfloor vent, and slab deflector (Dutton, 1938: 61-62). The masonry at Leyit Kin was uncured, one and two stones wide, and the surface finish ranged from crude with large amounts of exposed mortar to well dressed blocks with occasional spalling.

Farther afield, Morris' kivas from the La Plata show considerable variation in Pueblo III times, but there is no group of which the three from del Arroyo might be considered typical. At his Site 33, Building I, he ascribes Kivas 5 and 6 to the "Chaco phase of Pueblo III." Kiva 5 is what would be considered a classic example in the Chaco, with wide bench, no pilasters, circular in shape, subfloor ventilator, slab deflector. Kiva 6, also circular, with a high and narrow bench and eight pilasters, also has the subfloor Chaco ventilator (Morris, 1939: 52-53).

Kivas which Morris considered as belonging to the Mesa Verde Phase are more numerous; the best examples are five in Building XVI at Site 41 (1939: 107-112). Of these five,



FIGURE 53. Bonding of Room 07 (right) with the exterior wall of Pueblo del Arroyo.

only two have all of these features: keyhole shape, six to eight pilasters, ventilator shaft opening above the floor, and masonry deflectors. Four of the five have above floor vents and pilasters and only two of the five, keyhole shape.

If we take these items which Morris finds in the Mesa Verde kivas of the La Plata to gauge our kivas against, we find that of the triple-walled group only one of the three complete kivas has two of these four features (masonry deflectors and above floor vents) while the remaining two kivas have only one of the four features, above floor vents.

At this point it would seem that the kivas here could be described only as a generalized San Juan style, certainly without strong influence from the classic Chaco style, and whose closest relatives are the small, variable kivas from Chaco sites Bc-50 and Bc-51.

Rooms.—Of the 11 areas which were given room numbers during clearing, only 3, numbered 010, 021, and 023 can be considered as true rooms; the remaining 8 were small areas left by walls enclosing kivas, etc. Like the large circular structure, most of the room walls had been razed in pre-historic times for the building stone. The north wall of 023 and three walls of 021 were completely missing. Of the remaining walls few sections were higher than 2 feet.

The single floor feature was a basin-shaped firepit in 023.

Tree-ring Data

Douglass (1935: 51), from specimens obtained by the several National Geographic Society Beam Expeditions, lists 30 tree-ring dates from Pueblo del Arroyo. These dates range from A.D. 1052 to A.D. 1103, with a group of six dates at 1103. Smiley (1951), has 35 dates for the site.

Provenience of these dates was not given in either publication and since the society's excavations cleared the triple-walled structure and at least 9 contemporary rooms, as well as the work in Pueblo del Arroyo proper, there was a chance that the dates had come from the Tri-wall level. Through the kindness of Bryant Bannister, Curator, I was able to

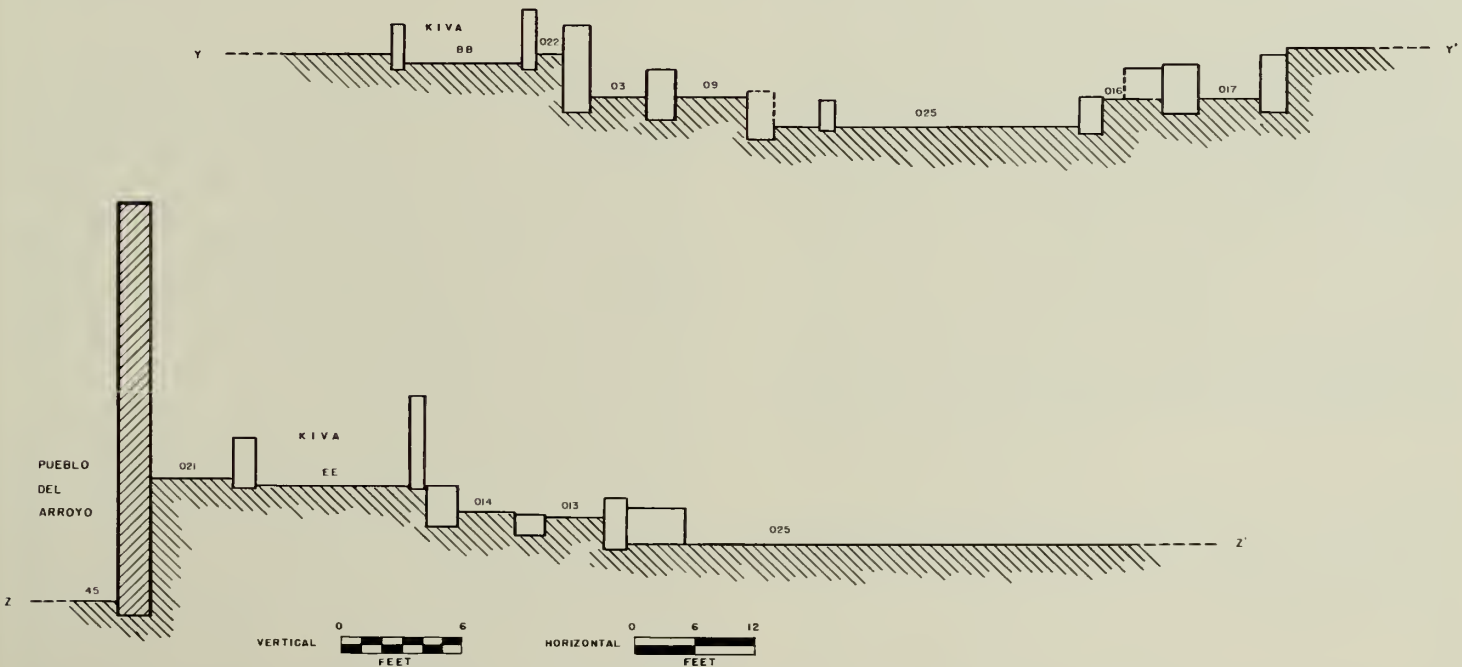


FIGURE 54. Sections through the Tri-wall structure showing its relationship to the floor levels in adjoining Pueblo del Arroyo.

check the provenience of the 35 dates at the Laboratory of Tree Ring Research against the room numbers on the National Geographic Society's ground plan of the site.

None of the dated tree-ring material had come from the Tri-wall or its associated structures. All was obtained in the area of high-standing walls in Pueblo del Arroyo proper. Plotted on a ground plan of the site these dates furnish some interesting data on the possible age of the adjoining Tri-wall structure and its contemporary rooms and kivas. In the central house block of Pueblo del Arroyo there are 11 dates ranging from A.D. 1052 to 1086: 1052, 1064, 1062 (2), 1072, 1075 (3), 1077, 1086. The triple-walled structure adjoins the west wall of this central house block and we feel certain that it must post-date this general period of A.D. 1052-1086.

From the south wing of Pueblo del Arroyo there are 16 dated timbers, ranging from A.D. 1074 to 1103: 1074, 1096+ (2), 1097+, 1098, 1100 (2), 1101+, 1102, 1103 (7). The 1074 date is possibly a reused timber and the seven dates at 1103 suggest that this was close to the actual building date. One kiva and seven rooms of the Tri-wall group abut against this south wing of Pueblo del Arroyo. Again we are certain that they post-date this 1103 date of construction.

Three dates, the provenience given as "pilaster log", "south wing" and "room 261" cannot be located with certainty. Five dates in the north wing can be located. They range from A.D. 1088 to 1117: 1088, 1090, 1101 (2), 1117. These could have no bearing on the period of Tri-wall construction as they are on the opposite side of the site.

Following our 1950 work we were able to locate five pole stubs embedded in the east wall of Room 1, one of the Tri-wall level rooms excavated in 1926. Of these five poles, one a piece of either Douglas Fir or spruce, had some 50 rings and gave a date of A.D. 1109 (Bannister, letter of September 16, 1957). In Bannister's opinion there were no outside rings lost and 1109 was the cutting date.

This is somewhat earlier than I would have thought. It is also just a single date and it may represent a reused timber. On the other hand construction of the outermost rooms in Pueblo del Arroyo at A.D. 1103 seems well fixed and the Tri-wall and these contemporary rooms and kivas could have been constructed against them six years later at 1109.

ARTIFACTS

Ornaments

Five turquoise pendants, two turquoise beads, and two small fragments of turquoise, all from a thin ash lens on the floor of Room 08.

Pipe

A fragment 2 inches long of a tubular pipe of pottery; the surface appears unslipped and is coarse and abrasive. From level of Room 03.

Awl

A single bone awl 4 inches long, with the head of the bone ground flat and perforated. From floor level 03.

Miniature Vessel

A miniature pottery olla 1 inch high and one-half inch in greatest diameter. Found in the fill, northwest side of Kiva DD, on top of the fragmentary wall.

Effigy Vessel

A fragment of an effigy in circular form. Pieces such as this are fairly common in Chaco Canyon sites, a portion of a hollow, circular vessel with a spout at one end; enough of them have been found at various sites to suggest a standard form.

DISCUSSION

Pottery recovered from the Tri-wall and adjoining rooms at Pueblo del Arroyo is discussed in some detail in a previous section. It now remains only to consider this pottery as it affects the placement of the site in the Chaco sequence. As might be expected in a rather short lived-site which was razed for its building stone in prehistoric times and which had previously been excavated in part, there were no whole or restorable pieces found. Refuse was thin and scattered and the sherd material scanty. What sherds were recovered came from floor levels and from thin ash deposits directly on floors. The entire clearing produced 711 decorated Black-on-white sherds and 135 sherds of redwares. These are shown in percentages below.

<i>Black-on-white</i>	<i>Percent</i>	<i>Redware</i>	<i>Percent</i>
Escavada Black-on-white.	21	Wingate Black-on-red...	40
Gallup Black-on-white...	11	Puerco Black-on-red...	34
Chaco Black-on-white...	36	Smudged interior.....	26
Mancos Black-on-white...	6		
McElmo Black-on-white.	25	Total.....	100
Mesa Verde Black-on-white.....	1		
Total.....	100		

In regard to the bare 1 percent of Mesa Verde sherds we are unwilling to follow the dictum that the latest material present should date the site. They are too few to admit of a Mesa Verde occupation of the ruin. We much prefer to believe that these few sherds came from a time of reoccupation of the canyon when the Tri-wall was being razed for building stone. The trade sherds, particularly the Wingate Black-on-red, also point to an earlier occupation as does also the lack of the polychromes associated with the Mesa Verde occupation of the Hubbard Site.

It might be considered and with some logic that, since Mesa Verde material does occur in some classic Chaco sites, and since McElmo is preponderant in at least one site, the presence of a few Mesa Verde sherds here merely marks the transition from McElmo, its progenitor, to full Mesa Verde. While this might be true elsewhere it does not appear to be the case in Chaco Canyon. While McElmo Black-on-white did outlive the hachured Chaco at Kin Kletso, it did not continue into the Mesa Verde type there. Roberts (1927: 240) remarks that McElmo (Chaco San Juan) was abundant at Pueblo del Arroyo, but he does not record its continuation

into Mesa Verde. The same is true of its appearance in the upper third of the refuse at Penasco Blanco (Roberts, 1927). Sites Bc-50 and Bc-51 produced some McElmo, roughly 10 percent, but no development into Mesa Verde.

On the other hand a small site of five or six rooms near Gallo Canyon investigated by the writer (Vivian, notes on the Headquarters Site) showed a total of Mesa Verde Black-on-white sherds of a rather decadent character, and no McElmo. The weight of all evidence so far gained shows that, while the Chaco continued to be occupied till near the close of the 12th century, there was a break between this occupation and a reoccupation in quite small groups by carriers of well-developed or even decadent Mesa Verde Black-on-white (Montezuma Phase). There is no way at present to judge the extent of this break, nor is there any evidence to show that it could not have continued for nearly a century.

McElmo and Chaco Black-on-whites are the most abundant and also the latest types associated with the occupation of the Tri-wall community. Both Roberts' trenching of the Penasco Blanco dump and Judd's Bonito work (Judd, 1954: 231) show that these two had contemporaneous or nearly contemporaneous beginnings. At Pueblo Bonito, McElmo (Judd's Chaco/San Juan) made up 6.6 percent of "all tabulated sherds" and occurred most frequently in the latest rooms (Judd, 1954: 231). Hawley (1934: 42) states that Mesa Verde Black-on-white made up 2 percent or less of the sherds in the refuse at Chetro Kettle. She describes this Mesa Verde ware as having carbon paint and illustrates designs which appear to be McElmo rather than Mesa Verde Black-on-white. Further, there appear to be no designs on the exteriors of bowls. Whether this is McElmo or Mesa Verde Black-on-white is immaterial here. What it does point up is, that if McElmo was present at Chetro Kettle it was very poorly represented there.

As far as can be determined, then, McElmo Black-on-white, while present at most or all Chaco sites of the Classic period, nowhere reaches the proportions in which it was found at the Tri-wall. The same is probably true of Chaco Black-on-white. These two late types together made up 61 percent of the Black-on-white pottery there. It follows then that the Tri-wall community is somewhat later in time than the classic Chaco sites where these late types are very poorly represented. This statement excepts Kin Kletso, where a date as late as A.D. 1178 has been recorded and whose pottery is almost entirely McElmo and Mancos. It also excepts by inference the identical sites of Casa Chiquita and New Alto.

From the evidence of the pottery and the architecture, we cannot agree with Roberts (1927: 240) that the triple-walled building was contemporaneous with Pueblo del Arroyo. In the first place it is higher than Pueblo del Arroyo, in a position where only the accretion of the valley floor could so place it. Six feet of soil had accumulated against the west side of Pueblo del Arroyo before the Tri-wall addition was made. The kivas and the Tri-wall itself were sunk into this soil a short distance, but their floors still remained 2.5 feet above the lowest floors of Pueblo del Arroyo itself. The room floors are still higher above the

Pueblo del Arroyo floors. We do not deny that Pueblo del Arroyo may be late in the classic Chaco sequence, but it undeniably belongs to it. Pueblo del Arroyo exhibits the same Chaco, open-plaza plan, kiva styles, and architectural arrangements as do the admitted classic Chaco sites of Penasco Blanco, Pueblo Bonito, Chetro Kettle, Hongo Pavi, Una Vida, Wiji, Pueblo Pintado, and Kin Biniola.

On the other hand, the Tri-wall community does not show this Chaco pattern. The masonry style of the Tri-wall does not appear in Pueblo del Arroyo except in remodeling and in filled doorways; the rooms are much smaller; the kiva styles are different. The Tri-wall group was obviously built along the west wall, around the corner and down the south side of Pueblo del Arroyo, some time after that building was completed.

The single tree-ring date suggests that this may have been an interval of 23 years after the central house block was built and 6 years after the south wing was added.

The architecture and pottery assemblages of the Tri-wall group all indicate that the influence of classic Chaco was negligible here and that the occupation came at a time when Pueblo del Arroyo and its contemporaneous classic Chaco sites had passed the period of their expansion and were entering the period of decline and abandonment.

This triple-walled community was not the sole late occupant of the Chaco. The incidence of McElmo pottery at the "Bc sites" has been noted. Hawley has published dates of A.D. 1043 and 1077 for Bc-51 (1939: 43), and Kluckhohn believed there were grounds for suspecting that a considerable proportion of Bc-51 was used at least as late as A.D. 1050. He is explicit in stating that Bc-51 was at least used in part synchronously with the great pueblos of Chetro Kettle and Pueblo Bonito (1939: 43). Bc-59, a very similar site adjacent to Bc-51, was excavated by the University of New Mexico in 1947 and has remained unreported. In 1950, the writer, in the course of work there recovered portions of a lintel from a kiva vent shaft. This was dated at A.D. 1110 (Bannister, personal communication December 27, 1952).

The work at Kin Kletso (Vivian, manuscript in preparation) shows that a site in the canyon whose plan and architecture are not typically Chaco, and whose pottery is Mancos and McElmo, continued to be occupied until at least A.D. 1178, or some 50 years beyond the known occupation of the classic Chaco pueblos. Casa Chiquita and New Alto are, from surface indications, contemporaneous with Kin Kletso. These three, together with Bc 50, Bc 51, and Bc 59 are not Chaco in plan or architecture.

A somewhat similar site, non-Chaco in plan and with a comparatively late phase, is Leyit Kin (Dutton, 1938) a small ruin on the south side of the Chaco opposite Pueblo Bonito and Chetro Kettle. Leyit Kin contained 19 rooms and 3 kivas. Dutton was able to segregate three separate periods of construction, each separated from the other by layers of deposition and differences in architecture. Her first or lowest unit need not concern us here.

Unit II at Leyit Kin, comprising the major part of the architecture in the site, held one kiva providing 18 tree-ring

dates between A.D. 1011 and 1045. Seven of the timbers were cut in 1039, one in 1040, and only two later than this. She considers 1040 the building date. A second kiva and several rooms were thought to be slightly later than A.D. 1040.

Sherds from this period, Unit II, are said to be predominantly Pueblo II with some representation of Pueblo I and III (Dutton, 1938: 93). Dutton does not list these pottery types. However, Rooms 1 to 5, 15 and 16 and 7 to 9 inclusive, together with Kivas A and D, are said to make up this period designated as Unit II. Tables V to VIII, XII to XVI, XXI, XXII, and XXIV show that the whole or restorable pottery recovered from these rooms and kivas were: Deadmans Black-on-white, 1; Puerco Black-on-white, 1; Puerco Black-on-red, 1; Gallup Black-on-white, 2; McElmo Black-on-white, 2; Mesa Verde Black-on-white, 2. In this case Gallup, McElmo, and Mesa Verde Black-on-whites all have the same representation. The one note on named sherds (Dutton, 1938: 40) states that Gallup Black-on-white sherds were predominant in Room 3.

Dutton's Unit III represents the last period of occupation, one in which rooms were reused after about 1½ feet of deposition had accumulated on the floors and in which a new kiva of "keyhole" style had been constructed. Pottery from this level is classified as:

<i>Sherd type</i>	<i>Percent</i>
Gallup Black-on-white.....	49.0
Mesa Verde Black-on-white.....	37.0
Chaco Black-on-white.....	5.2
Chaco, Mesa Verde decoration.....	3.9
<hr/>	
Total.....	95.1

McElmo Black-on-white is missing from this assemblage; so are the polychrome wares usually associated with Mesa Verde Black-on-white. It should also be noted that, on the basis of this pottery, Dutton estimated the occupation to have extended "to near the middle of the twelfth century" (Dutton, 1938: 94). Mesa Verde Black-on-white is not considered to have developed prior to the last quarter of that century. However, if we can here reasonably equate Dutton's "Mesa Verde" with the well-developed McElmo Black-on-white from Kin Kletso and the del Arroyo Tri-wall, and with Roberts' Chaco/San Juan from Pueblo Bonito, Pueblo del Arroyo and the Penasco Blanco refuse, then its grouping with the earlier iron-paint Gallup, the lack of Chaco Black-on-white, and her estimated terminal date of A.D. 1150 all tend to place this phase of Leyit Kin in the group of late, pre-Montezuma Phase sites with strong San Juan affiliations.

Previous students of the Chaco (Roberts, Hawley, Kluckhohn), in discussing pottery in particular, have all suggested the possibility that McElmo pottery was introduced by a group of migrants from north of the San Juan. It would not seem amiss now to suggest further that at least several of the "Bc sites" (such as 50, 51, and 59) represent in part either the beginnings of this migration or an indigenous population with strong northern San Juan ties. For various reasons not brought out here, the writer favors this later view. It would follow that the triple-walled community at Pueblo del Arroyo, Kin Kletso, and probably Chiquita and New Alto, represent the climax of this movement. If this is a tenable position, then the triple-walled community is not an isolated instance of a foreign architectural form but is merely one late phase of a long-continuing movement.

Mound F at Aztec Ruins

THE SITE

At the conclusion of his work in the Hubbard Site in July 1953, Onstott conducted limited tests in Mound F (Ruin No. 4 of Onstott), another circular mound lying between the West and East Ruins at Aztec (Fig. 55). Mound F is roughly

circular, some 120 feet in diameter at the base, and rises to a brush covered height of 8 to 9 feet.

Previous tests in this mound and wall outlines on the surface had indicated that it was also a round building with circumferential rooms. Onstott's tests led him to the conclusion that Mound F was "... a very similar building to

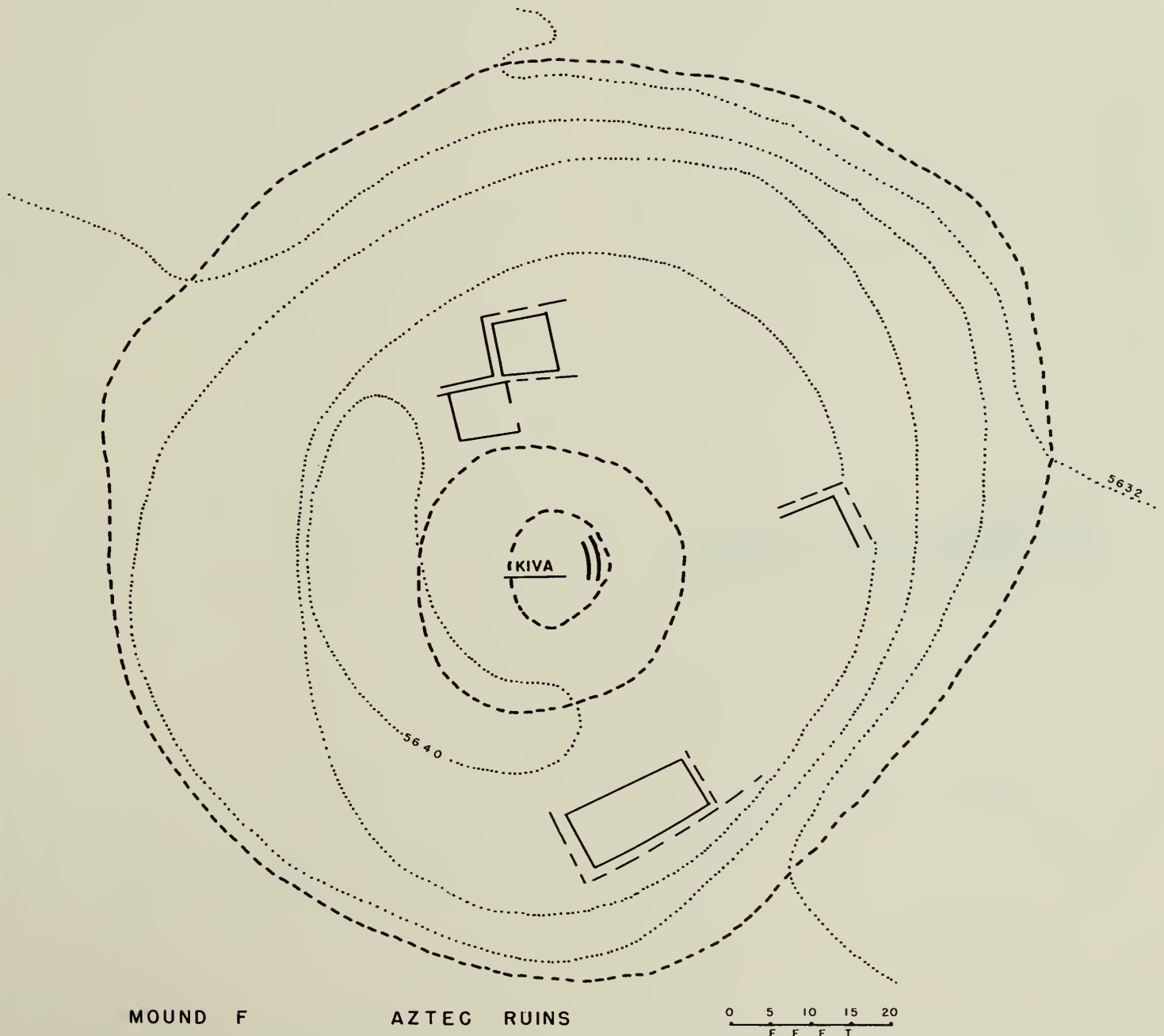


FIGURE 55. Plan of Mound F at Aztec Ruins.

Hubbard Ruin. It has two concentric rings of rooms and apparently was remodeled from a central plaza to a central kiva."

Unfortunately we seem to have no sherd collections from this site. However, one of the earlier tests was made by Earl Morris. Concerning sherd material Morris wrote to E. K. Reed (letter of November 12, 1946), "And I once sunk a pit in a chamber on the east side of the other mound referred to [Mound F]. There were Mesa Verde sherds on the floor and a burial from that period beneath it. It would seem to me that both structures [the Hubbard Tri-wall and Mound F] were erected by the Mesa Verde reoccupants of that locality."

CENTRAL KIVA

Onstott's primary interest was in learning if Mound F also held a kiva in the central area. A test hole dug at the south side of the central depression exposed the southern arc of a kiva with a probable diameter of 14 to 18 feet. The outer wall, two pilasters and the bench face were exposed. The floor was not reached. The masonry pilasters were 2 feet wide at the face of the bench and 2 feet high.

Of interest here, aside from the primary fact that a kiva was present, were the remains of cribbed poles still in place above the low masonry pilasters. Our information is rather limited. However, this excavation was visited briefly by the writer shortly after it was abandoned. Roland Richert then, in the course of other work nearby, made a photographic record of the poles in place (Fig. 56), took one full section for tree-ring dating—a sample without issue to date—and carefully backfilled the hole as the best means of preserving the timbers.

These horizontal poles are of juniper. Three were present above the one span cleared. The end of a fourth pole shows

above them at the east side. Several more poles were present in the fill, enough to suggest that the cribwork reached to the level of the existing wall top. The poles were small, 0.3 foot in diameter.

Arrangement of Cribbed Poles

The long poles in the cribwork did not overlap each other. Rather, each ring of poles made a complete circle and each level was separated from the one below by short "spacers", also 0.3 foot in diameter, laid across the joints, crib fashion. The span of the poles, the distance between the one set of pilasters cleared, was 5.2 feet.

These small poles rising from the pilasters may be the lower members of a cribbed roof. It is also possible that the kiva roof rested on the top of the wall and was flat or nearly so, and that these poles represent an internal arrange-

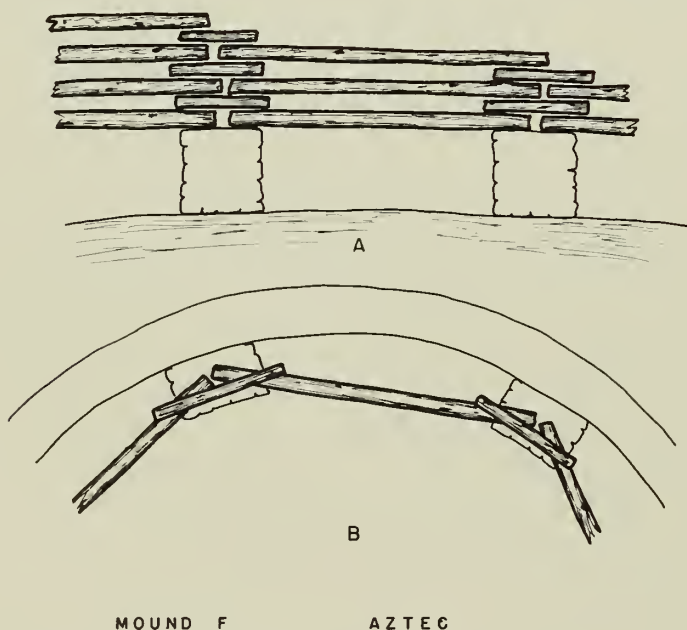


FIGURE 56. A—elevation showing arrangement of cribbed poles separated by short spacers between the poles. B—plan of cribbed poles.

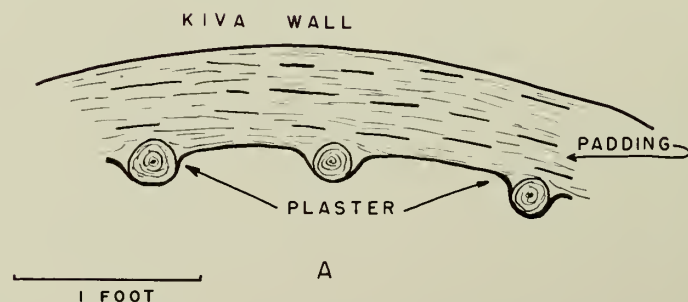
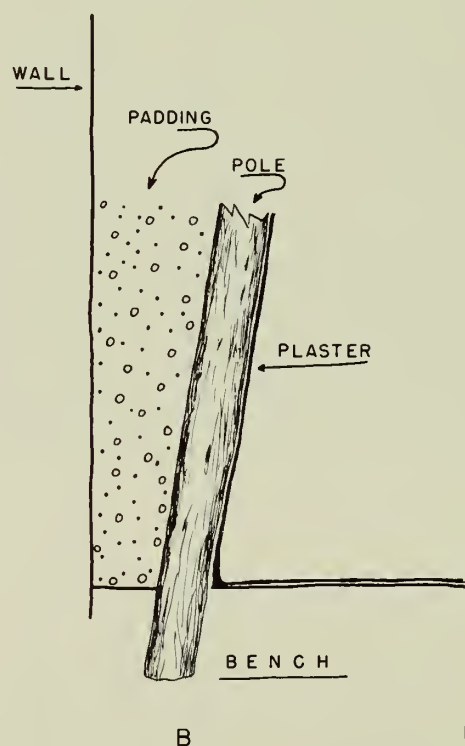


FIGURE 57. Detail of pole wainscoting at Chetro Kettle. A—cross section showing inward slant of poles; B—plan.

ment of another sort. Their small size, 0.3 foot, would almost seem to preclude their supporting an earth covered roof. In the one span cleared the distance from the wall to the pole in the center of the chord was 0.9 foot. This space would be filled with dirt if a roof were not present above the cribbed poles. The regular spaces between the poles would also add to the difficulty of constructing an earthen covering over them.

Comparable Features

The horizontal poles rising from the low pilasters are reminiscent of the pole shelves found between the pilasters at Kivas B and D in Lowry Ruin, although the shelves there were more widely spaced and plastered on top (Martin, 1936: 42). They also produce approximately the same effect as did the vertical wood wainscoting found at the back of the bench in many kivas in Pueblo Bonito and Chetro Kettle in Chaco Canyon. Pepper (1920: 81 and Fig. 27) recorded the remains of such a wainscoting in Kiva 16 at Pueblo Bonito. There 14 small vertical poles remained at the back of the bench. They were "over 5 cm. in diameter", 18 cm. apart and out 13 cm. from the wall. Other remains at Pueblo Bonito show that some of this vertical wainscoting was of hewn planks rather than small poles.

The author remembers seeing similar wainscoting excavated at Chetro Kettle (Fig. 57). Reiter (1933: 31, 32 and Fig.) describes this feature in Kivas G and I as of small juniper poles set toward the rear of the kiva bench, 9 to 14

inches apart and remaining up to 2 feet in height. They were "almost upright" but sloped slightly toward the kiva center. Behind the poles, filling the space between them and the wall, was a heavy padding of grass and reeds. The thickness of the padding varied somewhat but averaged 4 inches at the bottom in Kiva I and increased with the inward slant of the poles to 9 inches at the top, a height of 2 feet. The most remarkable circumstance here is that the poles and padding were carefully plastered over. The surface of the wall was undulating, the plaster following the form of the poles and the short chords of padding. Whatever the purpose of the padding, it was well concealed behind the plaster.

SUMMARY

Size, shape, wall outlines on the surface, and limited testing led Onstott to the conclusion that Mound F was a triple-walled structure with two concentric rows of rooms. The earlier testing by Morris exposed Mesa Verde sherds on a room floor and a Mesa Verde burial below the floor. In the absence of other data to the contrary, Mound F could be said to be contemporary with the Tri-wall Level of the Hubbard Site. The horizontal poles above the pilasters in the kiva at Mound F have counterparts in the pole shelves at Lowry Ruin and in the vertical pole wainscoting at Pueblo Bonito and Chetro Kettle. These somewhat similar occurrences strengthen the feeling that the Mound F poles were not parts of a cribbed roof structure.

Chacra Mesa Tri-wall

LOCATION

This site is approximately 5 miles south of the classic Chaco ruin of Pueblo Pintado. It is on the south escarpment of the Chacra Mesa, overlooking a vast drainage basin extending to the Dutton Plateau on the south and the Mount Taylor uplift on the southeast. No accurate maps of the Chacra Mesa exist, and no corners were located. The ruin would appear to be in section 8, T. 19 N., R. 8 W., New Mexico Principal Meridian.

The immediate location is a high, steep-sided sandstone remnant (Fig. 58) on the Chacra Mesa. The south side of the small mesa forms part of the general escarpment and is several hundred feet high. The remaining sides of the small mesa are approximately a hundred feet in height. Access is limited to two former trails on the north side. Both of these are still bounded in part by walls that formerly must have enclosed the exposed side of the trail away from the mesa. Portions of additional walls remain at the trail heads, and scattered remains along the mesa top suggest that at least the entire north side of the mesa was formerly walled.

The mesa top still holds some topsoil and scattered pinyon and juniper, but for the most part it is barren, with large

exposures of bedrock and numerous boulders. Below this highest level, the Chacra Mesa is somewhat more heavily timbered with pinyon and juniper, though agricultural land in the immediate vicinity of the site would have been at a premium and limited to small plots.

THE SITE

The site (Fig. 59) is now an oval mound about 110 feet in diameter; there is standing wall to a height of 8 feet on the north side. On the south, the side of greatest exposure, the mound is greatly reduced. The underlying bedrock slopes to the south and drainage from the ruin was in this direction. Erosion has removed the southern arc of the mound, and the bedrock is exposed back into the central circular area. Erosion on the bare rock has also removed any refuse deposits outside the mound.

Within the mound, surface indications of concentric rows of rooms are definite in some areas. However, where in other triple-walled sites, only rooms (with the exception of a possible central kiva) were enclosed within the circular wall, here both kivas and rooms were enclosed within the more or less circular (or oval?) building.



FIGURE 58. The Chacra Site is in approximately the center of this small mesa. There are remnants of a protective wall around the mesa rim; trails to the mesa top were walled in from the top of the talus to the rim.

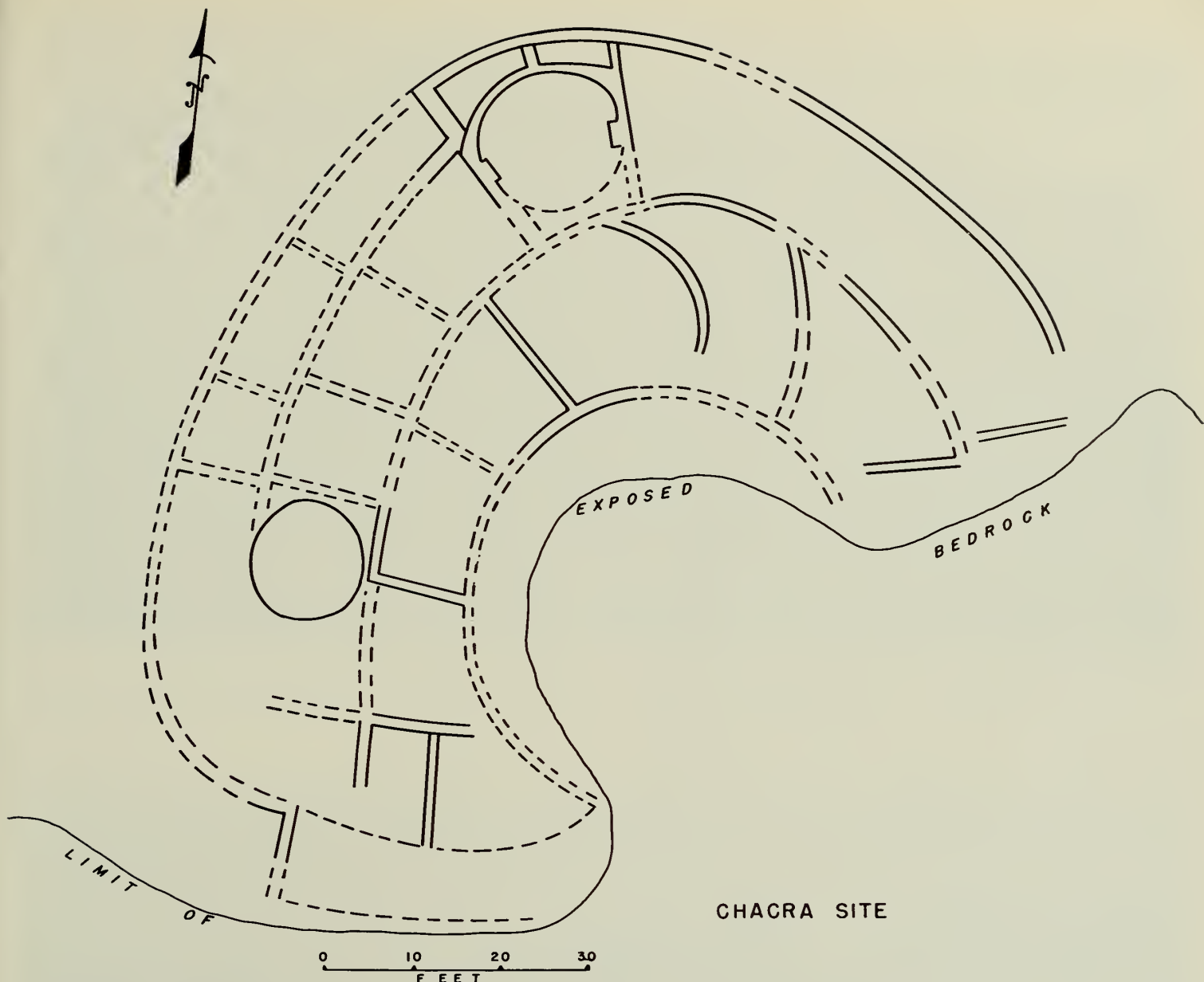


FIGURE 59. Ground plan of the unexcavated Chacra Mesa Site. It stands for the most part on bedrock, and erosion has carried away wall remains and debris at the south side.

Masonry (Fig. 60)

Exposed masonry is of random blocks of sandstone. Size varies greatly with some blocks 2 feet long and 8 to 10 inches thick. The blocks were dressed on the exposed faces only, with only occasional rough shaping on the upper and nether surfaces. The walls have a very crude appearance when compared with the regularly dressed blocks of the Hubbard and Pueblo del Arroyo Tri-walls. In more protected spots some chinking of small stones remains between the larger blocks; in all probability all wall surfaces were originally chinked with spalls.

Kiva (Fig. 61)

One kiva is partially exposed; standing wall is 5 feet high and the bench has been exposed at the north by a pot hunter's trench. The bench is narrow and there are two pilasters,

one on each side of the kiva. The south third to half of the wall has fallen but unless there was an odd arrangement of pilasters, two was the original number.

POTTERY

Since no refuse mound remains, sherds are rather scarce on this bare promontory. A surface collection of 90 sherds was made from the area within and immediately outside the walls. Sherds other than those listed below were confined to Chaco Black-on-white, Gallup and Mancos Black-on-whites and are considered as intrusives.

Mesa Verde Black-on-white

This is the predominant indigenous decorated ware; 68 sherds were of this general type. It appears to me as a somewhat decadent Mesa Verde which still retains most of the



FIGURE 60. Masonry detail, Chacra Site. This is the north exterior of the curved wall.



FIGURE 61. Remains of kiva at the Chacra Site. One of the two pilasters is at the extreme right of the standing wall.

Mesa Verde characteristics. Decoration is in Mesa Verde style in carbon paint but if we can judge from sherds, somewhat more open with less solid areas (Abel, 1955—both Mesa Verde and Galisteo). The surface color varies from pearly grey to white. Surfaces are well polished; some are finely crackled, others deeply crazed. Most rims retain the square, ticked Mesa Verde form while a few are thinned and rounded. Exterior decoration is present but less prevalent than on most classic Mesa Verde Black-on-white.

Abel (1955) gives the temper of both Mesa Verde and Galisteo as crushed sherd. Here again we note a variation paralleling that in the material from the Hubbard Site. The temper in these sherds is extremely fine; it is not conspicuous in cross section and is primarily fine quartz sand with occasional inclusions of dark rock. Dittert (1958: 68) noted a similar variance from the published description in Mesa Verde Black-on-white from a survey on the San Juan River in the vicinity of Gallegos Mesa. He found that "Sand, andesite and sherd temper were often combined in a single piece of pottery."

Tusayan Black-on-red

One fragment of a seed bowl.

Heshota-uthla Glaze Polychrome

Two small sherds.

Late St. Johns Polychrome Variants

First I am indebted to Mr. Stanley Stubbs who examined these sherds after this section was originally written; it has been subsequently revised. There are 15 sherds in the group. One which I had thought was ordinary St. Johns Polychrome is the North Plains Polychrome local variant from the Acoma district. There are three St. Johns Polychrome from the Winslow area; the surface color is orange and in one the paint is faintly glazed. The remaining 11 pieces show considerable variation and they were classed by Mr. Stubbs as generally being St. Johns Polychrome, including the glaze-paint variety which now is referred to as Springerville Polychrome. Some of the pieces with dark red slip and narrow line, black glaze paint decoration I would have classed as Pinnawa Black-on-red (Colton and Hargrave, 1937: 113). For the remainder, Stubbs' charac-

terization is similar to that described by Reed (1944: 168-170) for a like assemblage from the Manuelito district which he described as a late development of St. Johns Polychrome, or Klagetoh Polychrome in the broad sense.

SUMMARY

In a general way the pottery assemblage from this site varies from that at the Hubbard Site. The Mesa Verde appears somewhat cruder and definitely more crazed and crackled, but this may be the result of isolation and the lack of suitable clays rather than a decline in technique. Where at the Hubbard Site the intrusive sherds included Querino Polychrome and St. Johns Polychrome, and glaze wares were lacking, here the Heshota-uthla Polychrome and glaze variations of St. Johns suggest a slightly later date and perhaps a slightly different area of contacts.

At the Hubbard Site, at Pueblo del Arroyo and at Holmes' triple-walled tower on the McElmo (Holmes, 1878: 398-399, Plate 39) the Tri-wall was part of a large community group containing house rooms and kivas. It would appear to be a highly specialized building in a normal community, or perhaps a community which became associated with a specialized structure. On the other hand Mound F at Aztec is to all appearances an isolated triple-walled structure without attached rooms or kivas. It does however lie within a few yards of the large East Ruin, a site of comparable age, and other numerous though smaller ruins. The double-walled structure with circumferential rooms on the Mancos, described and illustrated by Holmes (1878: 392-393, Plate 33), likewise is not attached to other structures though there are other sites in the near vicinity.

The Chacra Mesa example seems to be a further variation (perhaps a later one?) wherein the entire community was housed within the encircling outer wall. There are no evidences of additional rooms outside the wall, nor are there other sites close by. In the general Chacra Mesa area there are, however, other sites whose Mesa Verde pottery and similar intrusive sherds indicate that they are contemporaneous with the site under discussion. None lie within several miles of this site. If these circular double- and triple-walled structures served any specialized purpose, then the Chacra Mesa site perhaps performed this function in the general area for a series of late, isolated, short-lived communities made up of migrant groups from the Mesa Verde center.

Holmes' Double-and Triple-walled Structures

The double- and triple-walled "towers" which Holmes described in 1878 and which have not been reported further are summarized briefly here as an aid to later discussion.

THE SAN JUAN

Holmes recorded two "towers" (Fig. 62) on the San Juan River ten miles above its confluence with the Mancos, in northwestern New Mexico (1878: 393, Plate 31). The towers were located on the edge of a bluff some 35 to 40 feet above the San Juan. In the face of the bluff were numerous cave dwellings but the towers themselves were separate from other buildings.

His "Tower B" was double-walled, the inner circle 12 feet in diameter, the outer wall 22 feet. The outer wall was not a complete circle but was open toward the cliff. Whether this was the original plan or whether the wall had fallen is in question since Holmes states, regarding these walls, that the ends of the outer walls were "... projecting forward and irregular and broken as if portions had fallen." Between the two circular walls were "indications of partition walls that had originally divided it into a number of apartments."

His Plate 31 shows four partition walls with sufficient space for two or three more.

While Holmes refers to this structure as a "tower" and suggests that it had recently fallen, the outer wall had a maximum height of 3 feet and the inner wall a height of 6 feet.

His "Tower A," 150 yards distant and also on the edge of the bluff, was similar in form though much larger and more ruinous. Diameter of the outer wall was 140 feet and maximum wall height was 4 feet. Much of it was also reduced to a low mound. Partition walls between the circular walls were also present but Holmes did not estimate the number of enclosed rooms.

Holmes also reported numerous single-walled towers in this general area "... in nearly every case connected with other structures, mostly rectangular in form" (1878: 390). One other double-walled tower was located at the confluence of the San Juan and Mancos. The outer wall here was 40 feet in diameter; the inner wall 15 feet. Maximum wall height was 8 to 10 feet. The presence or absence of partition walls was not noted.

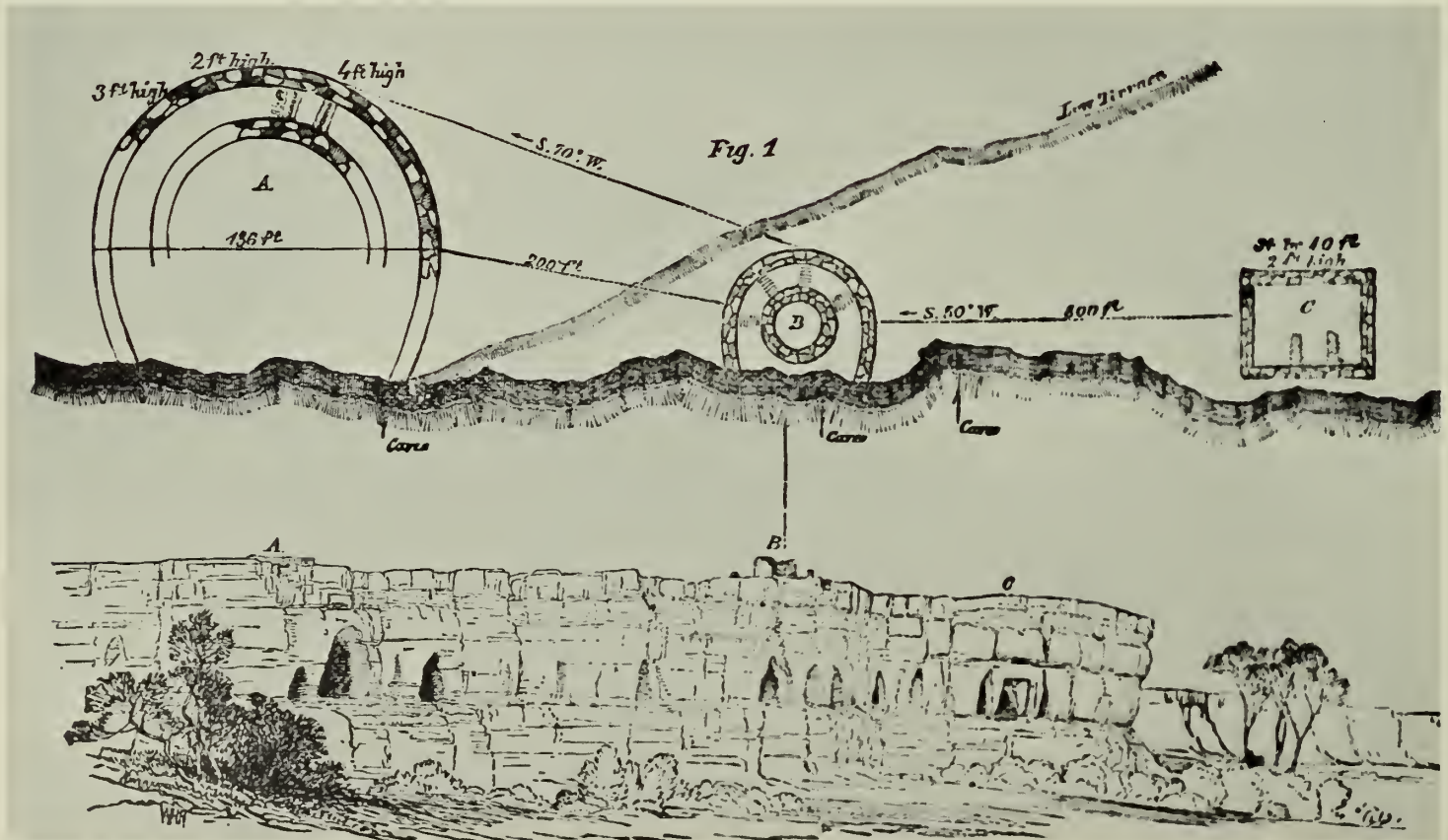


FIGURE 62. From Holmes, 1878, double-walled structures on the San Juan. His Building A, with a diameter of 136 feet, is the largest recorded double- or triple-walled structure.

THE MANCOS

A double-walled structure with partitions between the two circular walls (Fig. 63) was observed by Holmes about midway in Mancos Canyon. Diameter of the inner circle was 25 feet, the outer circle, 43 feet. Some of the partition walls were still standing and in Figure 4, Plate 33 Holmes shows 10 circumferential rooms. The maximum wall height remaining here was 12 feet, sufficient to determine the presence of two doorways between the inner circle and the rooms. Holmes also remarked for the first time, in describing these structures, that the central area doubtless served as an "estufa" because there was still evidence of a considerable depression in the center (1878: 393). This double-walled structure was not part of a house unit but stood by itself. There were, however, numerous other ruins in the immediate locality.

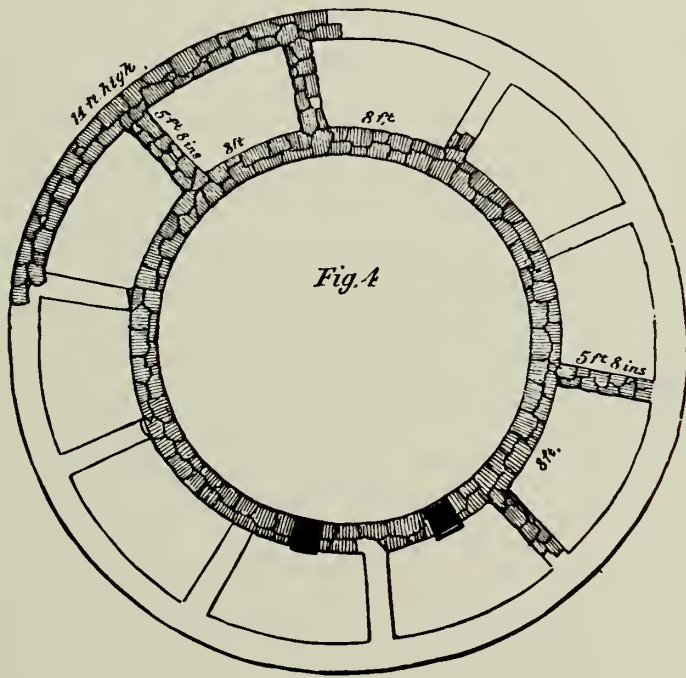


FIGURE 63. A height of 14 feet shown on Holmes' double-walled building on the Mancos, 1878, is the maximum recorded for circular double- or triple-walled structures.

THE McELMO

Most like the Hubbard Site and the Pueblo del Arroyo example is Holmes' triple-walled tower (Fig. 64) on a branch of McElmo Creek, a short distance south of the present town of Cortez, Colorado (1878: 398, Plate 39). The site is known locally as Dawson's Toltec Ruin.

As reported by Holmes the triple-walled structure was incorporated in a house block containing at least 33 rooms and a small "tower." A much larger house block containing at least 100 rooms lies just across a small wash. Di-

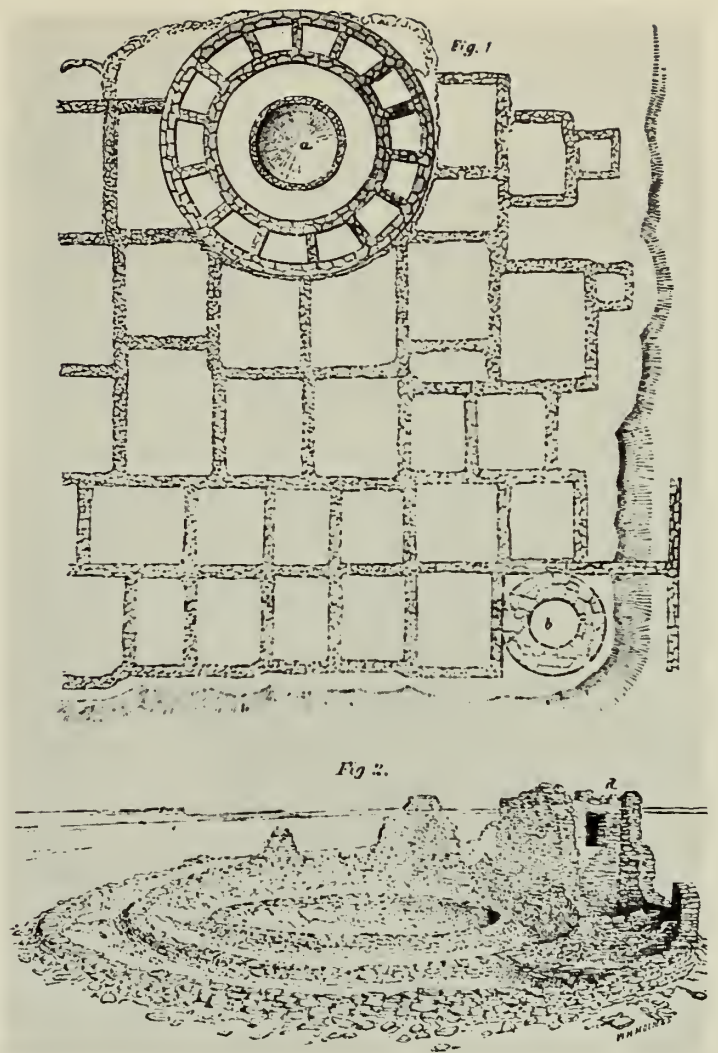


FIGURE 64. The triple-walled structure on the McElmo, figured by Holmes, 1878, bears a close relationship to excavated examples at Aztec Ruins and Chaco Canyon.

mensions of the triple-walled building are given as being similar to the structure on the Mancos, or an outside diameter of 43 feet. The space between the walls was divided into 14 rooms.

Wall heights here reached 12 feet. No doorways were observed in the circular walls, but one remained in a partition wall and it seemed probable to Holmes that there had been openings through all of the partition walls. Here again Holmes refers to the inner circle as an "estufa."

This site was visited by the writer in 1957. It is now fairly shapeless and heavily overgrown, and identification would be difficult without Holmes' plan. Surface sherds were scarce. Fortunately some pot-hunter who had just recently excavated one of the circumferential rooms had left a small heap of discarded sherds in the excavation. One of the sherds was a fragment of a Mesa Verde mug; the remainder were from classic Mesa Verde bowls.

Discussion

At least 10 double- and triple-walled structures are known and recorded. These are: Four double-walled "towers" on the San Juan River at or near its confluence with the Mancos; a double-walled structure on the Mancos; a triple-walled building on the McElmo (Holmes, 1878: 389-399); the Hubbard Site and Mound F at Aztec; the Tri-wall at Pueblo del Arroyo in Chaco Canyon; and the building on the Chacra Mesa. Ferdon (1955: 9, quoting Watson) reports a probable example of a triple-walled building on the Mesa Verde, the first such report from that densely populated area. Two of these ten, the Hubbard Site and the Pueblo del Arroyo examples, have been excavated. Another, Mound F at Aztec, has been trenched; a fourth, the Chacra ruin, has been surveyed and a surface sherd collection taken. We have then some data on just less than half of the recorded examples.

SIZE

The largest of the known sites is Holmes' double-walled structure on the San Juan with a diameter of 143 feet; a second San Juan example is 22 feet in diameter. One Mancos example and that on the McElmo are 43 feet in diameter. Other diameters are: Hubbard Site, 64 feet; Pueblo del Arroyo, 73 feet; Mound F, approximately 60 feet; and that on the Chacra, 110 feet. While the largest recorded structure is double-walled, the next in size is the complex building on the Chacra Mesa. The del Arroyo Tri-wall follows with 73 feet, and in general the more complex triple-walled buildings are larger than the double-walled structures. Unfortunately we have no sherd collections from any of the double-walled "towers" reported by Holmes and we are not in a position to hazard an opinion on whether one form preceded the other or if they were contemporaneous throughout their occupancy.

Holmes recorded maximum heights of 12 feet for two structures, one double- and one triple-walled, though his Plate XXXIII, Figure 4, shows a maximum height of 14 feet for the double-walled building on the Mancos. Features recorded by Holmes at these sites include: Two doorways 6 feet above the ground level giving access from the central area to two rooms in the outer ring; and one opening in a partition wall between rooms.

The maximum heights of 12 and 14 feet led Holmes to term these structures "towers". We are uncertain regarding the maximum height of the Pueblo del Arroyo example, since it was robbed of its building stone; but the maximum remaining height at the Hubbard Site was 7 feet. There were no viga sockets in the walls there, and the roof would have had to have been somewhere above the 7 foot level. The amount of debris removed at the Hubbard Site does not argue strongly for a complete second story but does suggest a maximum

height of about 12 feet. The highest remaining walls at the Chacra ruin are 8 feet. On this bare promontory, wall debris was quickly washed away; there is no debris at the base of the highest wall and the amount removed would be difficult to judge. Here also, no viga sockets remain in the outer wall.

The little available evidence from Holmes' report, from the excavations and from the present condition of unexcavated sites suggests that the triple-walled structures were not less than 12 feet high. Nor does the remaining height and fallen wall material at the Hubbard Site, at Mound F, or at the Chacra ruin suggest that they were ever more than 16 to 18 feet high.

At the Hubbard Site the Tri-wall rooms upon abandonment were used briefly as trash depositories. This deposition was made while the roofs were still intact. Although the evidence may have been removed by farming activities and road-building, there was definitely no block of house rooms on the north and east sides of the Hubbard Tri-wall. There were certainly at least one-story structures on the south and west sides of the building. Here I feel that trash deposition from a one-story house room, or from ground level, into a 16 or 18 foot tower would have been somewhat of a problem.

The question of kiva roofing inside a deep tower remains. Holmes reported "estufas" in the center of the structures on the McElmo and the Mancos. He says of that on the McElmo, "The inner wall has not been as high or as strong as the others, and has served simply to enclose the estufa" (1878: 399). At the double-walled "tower" on the Mancos (1878: 393) he recorded a door opening in the inner wall that was 6 feet above the then ground level. Does this suggest an opening out onto the roof of the kiva in the center?

Of the kivas in the centers of the Hubbard and Mound F Tri-walls we have possible roofing remains only from Mound F. These formed a cribwork of small poles rising from very low masonry pilasters. I strongly consider that these small poles might represent a form of wainscoting rather than an actual roof. The Hubbard central kiva contained similar low pilasters, and may have enjoyed the same type of wainscoting. The same problem remains. Were the kiva walls as high as the walls of the enclosing structure or was the kiva roofed on a lower level? If the central kiva was as high as the surrounding multi-walled building, then entrance down through the roof may have presented somewhat of a problem. If the kiva roof was lower, then access to the kiva hatchway could have been made by a doorway through a second story room.

In the great Pueblo III towns of the West Ruin at Aztec, Pueblo Bonito, and Chetro Kettle, there is no architectural evidence that kivas were roofed at other than the general

level of the adjoining secular rooms. The kivas neither stood up above the roofs of the adjacent structures nor occupied sunken positions. In the so-called "west tower kiva" at Chetro Kettle, rectangular walls, separate from house rooms, enclosed a kiva somewhat apart from other rooms. While this is negative evidence it does indicate that some attention was given to the exterior appearance of kivas.

The kivas in the double- and triple-walled buildings then were slightly out of the ordinary. They were considerably deeper than usual, roughly two-story kivas (the kiva floor at the Hubbard Site was 3.6 feet below the level of the Tri-wall floors); or, if of normal height, they occupied a sunken, hidden position in the center of an unusual structure.

COMPARATIVE STRUCTURES

On the Mesa Verde and westward into the Hovenweep drainage are structures or combinations of structures (Lancaster and Van Cleave, 1954: 103-105; Martin, 1929) which may be analogous to the double- and triple-walled buildings under consideration here. These are the "kiva-towers" found in numerous villages in that general area. They are described as a subterranean or partly subterranean kiva connected by a subsurface tunnel to a circular, tower-like structure. Lancaster and Pinkley (1954: 45) suggest that there were probably also rectangular towers which were connected to kivas. All kiva-tower combinations they believe were purely defensive in nature. Ferdon (1955: 8-12) considered the round towers a Mexican import dedicated to Quetzalcoatl in his role as god of wind and moving air. However that may be, the combination of a connected kiva and tower was a new concept in the architectural history of the area.

The time that the Mesa Verde and Hovenweep "kiva-towers" made their appearance and their probable duration are matters of some interest. Lancaster and Pinkley (1954: 78) date the construction of Unit Pueblo II at Site 16, an assemblage which contains three "kiva-towers", at A.D. 1074. This is a tree ring, bark date, from Kiva I in the Unit. The pottery complex here is primarily Mancos Black-on-white; the carbon paint wares, McElmo and Mesa Verde Black-on-white had not yet made their appearance. However, Lancaster and Van Cleave (1954: 103-105) in discussing a "kiva-tower" at another site in the same area, Sun Point Pueblo, report that fully developed Mesa Verde Black-on-white was found below the floor there, and they state further that most if not all of the "kiva-tower" sites have "notable ceramic associations" with either McElmo or Mesa Verde pottery, or both, and that it seems to them doubtful if any of the "kiva-towers" were built before A.D. 1100.

In general then, from the pottery associations—from Mancos Black-on-white at Site 16 at A.D. 1078 to Mesa Verde Black-on-white at Sun Point Pueblo, in the middle 1200's presumably—it follows that the kiva-towers described for that area and the multi-walled structures discussed here are at least in part contemporaneous. Considering the late

forms of trade ware found at the Hubbard and Chacra Sites, there is a suspicion that the triple-walled buildings may have outlived the kiva-tower arrangement.

The period in which the kiva-towers made their appearance is characterized as one which saw extremes of architectural experimentation and in which several mediums—post and adobe walls, single and double coursed masonry—were employed. Kivas went through several steps in development (Lancaster and Pinkley, 1954: 83). It was also a period of accelerated change. Small pueblos were erected, occupied, abandoned, stripped of their building materials and the site reoccupied, all in rapid sequence.

It might be considered as one possibility that, in this period of change and experimentation, the double- and triple-walled buildings were a further step in the kiva-tower arrangement. From connecting the kiva to a tower, the next step might have been to enclose the kiva within the tower. There are some obstacles to this view. In the first place we do not know that all double- and triple-walled structures enclosed a kiva. Further, in some cases at least, if the circular structure did enclose a kiva, it was certainly not the only kiva at the site. This was true at Pueblo del Arroyo, on the Chacra, and at least one of the double-walled buildings on the San Juan (Holmes, 1878: 383). It was probably true at the Hubbard Site even though extensions beyond the Tri-wall were largely obliterated by modern developments.

The combination of kiva and tower is not unique to the Mesa Verde region. Recent excavations in the Gallina near Lindrith, N.M. have exposed a similar pit-house-to-tower arrangement, the connection by tunnel. The Gallina Phase to which this trait apparently belongs is considered somewhat later than the advent at least of the Mesa Verde structures, with Gallina dates in the early to middle 13th century (Green, 1956: 192-193).

In conjunction with the multiple-walled circular structures and the "kiva-towers", which are items of the Mesa Verde branch, it might be well to note here that, while not exactly comparable, the Chaco area saw experimentation with aberrant circular structures at about the same time. We refer to the tower-kivas, particularly at the sites of Kin Klizhin and Kin Ya-a. Each of these ruins is dominated by a large circular tower-kiva whose interior is circular and whose exterior walls form a large rectangular tower, in each case not less than three stories in height. Neither of these sites has been excavated, and the floor features within the kiva area, if any, are unknown. Much smaller but similar structures are encountered in the excavated sites of Kin Kletso and Chetro Kettle. Here the tower-kivas are smaller circular structures incorporated within the house block. While incomplete, each was also not less than two stories in height. There were no floor features in either, but each also has a doorway at floor level. The example at Chetro Kettle contained a circular masonry column of unknown use at one side. If these various structures, kiva-towers and tower-kivas and double- and triple-walled buildings often enclosing kivas, are unrelated, they at least show among the Mesa Verde and Chaco Anasazi at the same general time a common interest in large circular structures.

Great kivas had a much longer tradition of use among the Anasazi than did the double- and triple-walled structures, since the former date back to late Basketmaker times (Roberts, 1929; Morris, 1939). However, the multiple-walled structures and the final, highly elaborated great kivas were contemporaneous in part, quite probably in the same area on occasion. It seems most likely that the periods of use of the Pueblo del Arroyo Tri-wall and the great kivas of Chetro Kettle and Pueblo Bonito overlapped at least in part; though, as has been previously stated, it is thought that the Tri-wall may have continued in use after the abandonment of the great kiva in the Chaco. At Aztec, both the Hubbard Site and Mound F are Mesa Verde structures (Montezuma Phase); and while the great kiva in the West Ruin had been abandoned prior to their erection, it was Morris' belief that this great kiva structure was refurbished and may have seen a limited amount of use during the reoccupation of the West Ruin (Morris, 1921: 135-137).

The great difficulty in seeking a derivation of the multi-walled buildings from the great kiva, whose peripheral rooms at Aztec suggest such a structure, is that none of the multi-walled buildings have, even when enclosing kivas, the elaborate floor features found in great kivas. However, if the impetus for the double- and triple-walled structures came from outside the Anasazi area, it is possible that the blending of the tower idea and the great kiva produced a hybrid form whose ancestry is barely recognizable.

OUTSIDE SOURCES

In seeking outside the Anasazi area for parallel architectural forms, the Meso-American region to the south has received increasing attention of late. Ferdon, in his recent survey of Mexican-American architectural parallels (1955), found many interesting avenues of comparison. He did not, however, have reports of multi-walled circular structures from the Mexican area and he specifically (1955: 12) exempts the triple-walled type of structure from this architectural comparison. Despite this lack of even a vaguely similar architectural form, however, Ferdon still felt, and possibly justifiably, that the triple-walled buildings must have some connection with or derivation from a Mexican source and the Quetzalcoatl cult.

A good many of the Meso-American elements which reached the Anasazi, however, seem to be objects rather than ideas. If may be worth while in the light of recent publications in this field to examine possible influences arriving during the period under discussion; do they remain as objects out of context, or is there with the adoption of ideas, the beginning of acculturation among the builders of the tri-wall structures?

Haury (1945: 55-74) presented Mexican-American contacts as the transfer of a series of elements of primary and secondary importance, with a further breakdown in techniques as applied to certain materials: Stone, clay, textiles. Of basic importance to any discussion is his uncontested view that the fundamentals of the later cultures, agriculture and pottery, were derived from a southern source. His

further statement that elements of Mexican culture found beyond this basic agriculture/pottery base did not all come from the same source is particularly apt when comparing elements among the Hohokam and Anasazi.

Ferdon (1955) has examined the Mexican architectural parallels among the Anasazi and the Hohokam; Jennings, Reed, and others (1956), examined a considerably wider range of contact elements. Beyond the primary agriculture/pottery base, the more important elements found among the Hohokam seem to be ball courts, platform mounds, village compounds, and "great houses." The latter authors also list a long series of minor items that have to do with pottery design and shape: Hatching, wavy lines, fringed scrolls, interlocking scrolls, small repeated geometric devices, fringed or ticked lines, band designs with vertical interlocking solid triangular elements, conventionalized small animal and human figures, small jars with flaring mouths and long necks, tripod and tetrapod bowls, basket handle bowls, probably basket handle bowls with legs. The great similarity in design and color between pottery of one Chalchuites phase and that of the Hohokam has apparently led some members of this group (specifically J. Charles Kelley) to think of the Hohokam almost as a northward extension of the Chalchuites.

Other elements not associated with pottery are: Urn burial, copper bells, figurines, and mirrors. Carving and incising of stone bowls and the making of turquoise mosaics are shown as possible Hohokam developments.

Items which Jennings, Reed, and others (1956), show as being found among the Anasazi but do not list for the Hohokam are: The piece of cloisonné decorated sandstone, shell trumpets, and a pottery stamp, all from Pueblo Bonito; parrot remains from several sites. These are all objects of trade, used probably out of their Meso-American context. Elaborate work in turquoise mosaic among the Anasazi is shown by the authors as probably due to Mexican influence while among the Hohokam it is considered as a probable local development.

The importation of elements on a different level—processes or ideas which may reflect the adoption of Meso-American patterns by the Anasazi, and which again were not in vogue among the Hohokam—are shown (Jennings, Reed, and others, 1956) as cylindrical jars of local manufacture, elaborately painted wood, the Southwestern plaza, and (Ferdon, 1955) core type masonry, column fronted galleries, circular towers.

While some point has been made of the fact that a quite different set of elements appear among the Anasazi as opposed to the Hohokam, suggesting different sources and possible different routes of transmission, it is also true that the selective process is always a factor and that out of the total cultural assemblage available quite different elements can be adopted by different groups. Further, by the accidents of excavation, preservation and observation we actually may see only a small fraction of intrusive elements.

While many of the objects listed above do certify to contacts between the Anasazi Southwest and the Meso-American area, it does not necessarily follow that acculturation in-

evitably follows contacts. The various forms that trait-unit intrusion has taken in the past are clearly demonstrated by Willey and others (1956). Perhaps this should be among our required reading, particularly the description of *chinoiserie*, which deeply influenced interior decoration and landscape architecture in Europe, especially in England, during the eighteenth and nineteenth centuries. The inspiration for this movement was partly literary and partly the importation of objects of Chinese manufacture. A theory of deliberate irregularity in garden design, which was attributed to the Chinese, was one of the first features of this movement; later, Chinese design elements were applied to articles of purely European form. The Chinese type of rectilinear latticework was used to decorate English furniture; designs from Chinese paintings and embroidery became wall paper motifs; and attempts were made to imitate the blue and white Cantonese porcelain which was popular as trade ware throughout the nineteenth century. The adaptation of Chinese decorative art to European forms and uses makes this a clear example of B2 contact. Chinese elements can be said to dominate only in a few borrowings such as the teapot, which lacks English prototypes.

Among the architectural elements noted by Ferdon (1955) and Jennings, Reed, and others (1956) as Meso-American traits intrusive in Anasazi construction there is possibly some basis for questioning a few specific items. The latter authors suggest that the Southwestern plaza was introduced from the south because plaza forms existed at the Schroeder Site of the Chalchuites culture near Durango, Mexico. If my understanding of this is correct, the plazas at the Schroeder Site were not part of a village layout as they are in the Southwest but were small, about 20 feet square, partly sunken, integral parts of individual buildings of ceremonial usage, and the plan or layout of domiciliary areas of this site are unknown. While forms can undoubtedly undergo change during transmission it seems odd that only the small interior part of a ceremonial structure would be adopted as the plan of a developing village layout springing from a grouping of pit houses. In this matter the Anasazi developed rather formalized domiciliary patterns of house rooms and kivas, implying a high degree of socialization, while the Chalchuites lived in scattered pit houses (or jacales?) here and there about the plain; their integrating factor was seemingly the isolated and separate ceremonial area.

Ferdon (1955: 6-7) notes among architectural parallels what he believes to be a platform mound in the Talus Unit, behind the large Pueblo III site of Chetro Kettle in Chaco Canyon. He compares this platform mound with Mexican examples, specifically that at Xolalpan. The room in question (#1934-3) he locates in the site as at "the west end of a building block containing rooms and kivas." Ground plans drawn by Wm. Chauvenet in 1934 show the room not to be at the west end but very near the center of this unit. At that date some 12 rooms had been excavated or outlined. Excavations in following years cleared additional rooms; by 1937 at least 20 had been done (Woods, 1937). At least 10 additional rooms remain unexcavated and, considering the whole site, the room to which Ferdon refers is actually nearer the east end than the west end. I bring this out to counteract any implication that the room in question might have been added at the west end as a religious structure at a late date.

Ferdon states regarding the excavation and interpretation of this room:

The excavation . . . began at the north wall where the fill was cleared away to the base of the walls, no floor having been recognized. The face of the "dig" was then moved southward to complete the operation.

Reaching what was regarded as a "partition" wall with steps, or benches, Woods reports the finding of what she calls a "raised platform" at each end of the lower two steps at a height slightly above the level of the central or second step. These are further described as having had squared corners and as being plastered over the top. Although these may be seen in her photographs of the excavation, later stabilizing operations neglected to take them into account, and a vertical facing was reconstructed at the ends of the steps. Also in comparing present-day photographs of the south face of this "partition" wall with those taken by Woods, it would appear that in stabilizing activities the wall height was increased about one foot, probably as the result of capping.

It should be noted that any stabilizing activities at this site to which Ferdon refers, were performed by the Museum of New Mexico very shortly after the excavation and were, I am sure, under the direction of the excavators.

Further, Woods' complete description of the "raised platforms," taken from her manuscript (1934: 16-17), reads as follows:

A feature of the room is the lower partition which roughly bisects its length. The central portion of the wall has a series of three steps, rising toward the north, each 8 feet, 1 inch long and approximately 2 feet wide. A raised platform at each end of the lower two steps, slightly above the level of the central one, seems to have supported two vigas running lengthwise along the partition wall. The holes in which their ends were buried were visible in the masonry above the two platforms, with fragments of decayed wood still in them. The platforms were plastered over the top and had carefully squared corners.

The complete quotation given above seems to rule out Ferdon's suggestion (1955: 7) that these platforms (about 18 inches square) at the ends of the steps were "an attempt at duplicating the balustrades, or stair-side extensions present in the majority of central Mexican substructures." Rather, the only interpretation I can place on the above description, after examining Woods' photographs of this partition wall, is that the two vigas whose ends rested horizontally on these platforms, which ran lengthwise of the partition wall, and whose ends extended into the masonry of the partition at a level slightly above the level of the middle "step", covered the steps and in effect obscured their form and nullified their use. There were quite possibly no steps here at all. There seems to have been a set-back in the masonry and in this set-back were two horizontal logs a little over 8 feet long. I can agree with Ferdon that the subsequent work of repairing the ends of the steps and the wall obscured the small "platforms" and the horizontal viga sockets in the short height of wall remaining above them.

One other point remains in regard to this room or rooms, and that is the height of the front wall. Ferdon believed that it was never much more than 2 feet high because that was its height upon excavation (1955: 6). It was, then, a room entirely open on the south except for this 2-foot wall or bench. If this were the correct interpretation, then it would also have to be applied to rooms and kivas on each side of this room, all of whose southern walls, cut steeply by erosion, were only about 2 feet high upon excavation.

Two other remarks about architecture require some comment. One is that core type masonry (faced or veneered masonry) had no precedent as of A.D. 1050 in the Anasazi area, and thus must have had a Meso-American development

(Ferdon, 1955: 4). At the Three-C Site in Chaco Canyon, an early Pueblo II site which antedated A.D. 1050 by some 100 or 150 years, there were walls of adobe in lifts or puddled construction which had thin veneers of stone on each side. This was basically a veneered wall where the load bearing portion was the heavy central core and the thin stone veneer added no support. The second comment concerns Ferdon's remark that a square column is an eccentric architectural feature among the Anasazi, bolstering his belief that the square columns at Chetro Kettle and Site Bc-51 show "the obvious implication of Mexican influence in the presence of this particular feature in two Chaco Anasazi sites" (Ferdon, 1955: 5). While these columns to which he refers in Chetro Kettle and Bc-51 may be the first Anasazi use of columns in a domiciliary structure, the form was not eccentric or unknown. Square and rectangular columns had been used by the Anasazi as pilasters in kivas at least since the time of the Twin Trees Site (Site 102), dated at A.D. 950, in the Mesa Verde (O'Brian, 1950: 28-43).

In summary, even if we admit the Meso-American origin of the possible wide stairway at Talus Unit, the columns at Chetro Kettle, and believe that the plaza came from the small, square, sunken form among the Chalchuites, these are all elements of Meso-American religious structures. Among the Anasazi they are parts of dwellings. If wide stairways appeared in kivas and the few pilasters in some types became column-fronted galleries along the kiva bench, then these elements would be more in context and their acceptance as adoption by the Anasazi more plausible.

There is, on the other hand, evidence of a less tangible sort that the Anasazi builders of the triple-walled structures had an awareness at least of foreign ideas. The numerous rock-cut stairways in close proximity to the Pueblo del Arroyo example and the large classic Chaco Canyon sites have been pointed out as an adoption of a widespread Meso-American trait (J. Charles Kelley, personal communication). These Chaco stairways parallel in form both the Meso-American masonry stairways and those cut from rock; they appear to be similar to the wide "roadway" cleared and cut through rock at the Chalchuites site (Schroeder site) near Durango, Mexico.

The Chaco stairways, leading usually to some part of the mesa top, and a faint example seen at Sliding Rock Ruin in Canyon de Chelly, are cut in rock to widths of 6 to 14 feet. They seemingly fulfill the requirements for the adoption of a religious or ceremonial trait; they have no antecedents among the Anasazi and they serve no utilitarian purpose. Often in the Chaco, and at Sliding Rock, they either parallel the narrow hand and toe trails or routes of easy access. One very wide stairway in the Chaco is cut in a gentle slope of rock where no modification of the slope would be required for access. In addition to and perhaps connected with the rock-cut stairways are the so-called "racecourses." These are wide, straight courses where minor alterations have been made to the natural terrain over a distance of several miles. They are difficult to examine at close range but are easily discernible from high points and on aerial photographs.

Jennings, Reed, and others (1956: 97), have also remarked

on the occurrence in the lesser material culture, especially in the Chaco area, of cylindrical jars, animal and human effigy jars, and elaborately fabricated and painted wooden ceremonial paraphernalia. They point out that these traits appear or become widespread coincident with the appearance of objects of known Meso-American origin. It could be pointed out also that the triple-walled structures make their appearance about this time. Architecturally the triple-walled structures have no known Meso-American counterparts nor do they incorporate minor Meso-American features. In the light of present knowledge the multi-walled structures appear as an Anasazi development coming in a period of intensified creativity. This is possibly of local impetus and possibly, though not demonstrably, the result of an intrusive cult practice acting upon but not submerging a long established ceremonial pattern.

DENSITY OF TRI-WALLS

There is no estimate of the number of Mesa Verde Branch sites occupied in the period from A.D. 1100 to 1300. It was certainly enormous when compared to the known number of double- and triple-walled structures. The density or intensity of this trait of multi-walled buildings was extremely weak in proportion to the total number of sites. This trait has an odd areal distribution. The triple-walled community on the McElmo is the known western limit. The other known sites, including a possible example reported on the Mesa Verde, extend southeastward to the Mancos, and on to the two examples at Aztec Ruins on the Animas; on south to Chaco Canyon and thence a short distance eastward to the Chacra Mesa. While additional discoveries may widen this distribution, at present it is just a line stretching some 120 miles in a northwest to southeast direction.

It should be noted further that while the homeland of the double- and triple-walled buildings was been considered to be the Mancos and McElmo region, possibly because of the numerous smaller "towers" there, sites which are at least as well developed are found in areas once occupied by or under strong influence from the Chaco Branch—Aztec Ruins, Pueblo del Arroyo in Chaco Canyon, and the Chacra Mesa. The ceramics from both our work and that of Roberts indicate that the Pueblo del Arroyo example was among the earlier if not the earliest of the triple-walled buildings.

One other observation might be in order regarding the intensity of this trait. That is, that while it is very weak numerically the double- and triple-walled units appear to be distributed among clusters of contemporary villages. Watson (in Ferdon, 1955) has suggested an occurrence on Mesa Verde. There were two at Aztec Ruins where there was a strong concentration of Mesa Verde (Montezuma Phase) pueblos. The Pueblo del Arroyo example was contemporaneous in the Chaco with the "San Juan" group of Kin Kletso, Casa Chiquita, New Alto, and possibly some talus units. The example on the Chacra Mesa is not in a close cluster of Mesa Verde pueblos but is nevertheless one of a number of contemporaneous sites there, rather widely spread and occupying defensive locations. It may be that further

surveys will reveal a pattern of double-walled or triple-walled structures accompanying widely-spaced clusters of contemporary pueblos. If this should be the case, the density of this trait can be considered to be much greater than a simple density based upon numerical proportion. Likewise the relative importance of the multi-walled structures could be thought of as much greater.

PROBABLE FUNCTION

Except for the two structures on the edge of the cliff on the San Juan recorded by Holmes (1878: 389) and Mound F at Aztec, the double- and triple-walled buildings are parts of small pueblos. Both these exceptions were close to contemporary groups. And if it can be shown that double- and triple-walled units accompanied clusters of contemporary villages, it is immaterial whether or not they were actually incorporated as a part of a village.

Most if not all of the multi-walled structures enclosed kivas and it would appear that they were in some way connected with kiva usage. Within the village at Pueblo del Arroyo, at the Hubbard Site and on the McElmo, the kiva was separated from the remainder of the unit or from the populace in general by the triple-walled structure. At Mound F and the double-walled tower on the Mancos the kiva was in the interior of a separate building. Within the encircling multi-walled buildings the lack of large firepits, subfloor vents, altars or deflectors, sipapus, firescreens, niches, foot drums or resonators, and other specialized features, as well as the small size of the rooms, suggests that they were not themselves used for religious observances. The presence of some ash and trash in the one at Pueblo del Arroyo and at the Hubbard Site, and the milling stones in the latter suggest domiciliary use. Can this be domiciliary use connected with a group attached to the kiva? Does a group domiciled about a kiva in a segregated part of the pueblo or in a separate structure between two villages imply the beginnings of a specialized class—a priestly class attached to the kiva, or an incipient theocracy?

Inference from the specialization in ecclesiastical architecture, so to speak, at this period lends some support to this possibility. Whether disregarding or taking into consideration the possibility of external influences from the Meso-American region, we see throughout the Chaco and Mesa Verde area that the basic, town-dwelling agricultural pattern with its religious emphasis upon agriculture, had become well established. There was everywhere in this general area a trend toward larger size, elaboration, and specialization—an accelerated tempo and branching out of long-established traits. Such structures as the multi-walled buildings, the great kivas in large pueblos, and the isolated great kivas such as Kin Nahasbas and Casa Rinconada (possibly New Fire House at Mesa Verde) serving several communities, bizarre structures like Sun Temple, the possible distribution of triple-walled buildings—all attest to this increasing concern with ritual. The elaboration in architecture, particularly of structures not an integral part of a single pueblo, also indicates a growing measure of social control.

We suggest as one possibility the idea that the circular, multi-walled structures enclosing kivas served as domiciles, places of instruction, and storage of paraphernalia for a developing priestly class. It is seen as a group serving both the kiva which the building enclosed and other kivas. It included perhaps a hierarchy of those concerned with ritual elaboration and its architecture, masks, wall paintings, and movable or slat altars. Such a hierarchy may also have included those concerned with large community agricultural projects: The elaborate system of irrigation works in the Chaco (Holsinger, 1901: 10, 11), the large terraces seen above Pueblo Bonito and Chetro Kettle, the dam in a re-entrant on the south side of the canyon, and previously noted, items such as the stone stairways and "racecourses."

It is realized that this proposition may sound absurd, on the grounds that such a theocracy never developed into an identifiable, priestly ruling class; and that a priestly ruling class was not in evidence as such at the time of European contact. However, these objections do not necessarily invalidate the proposition: The abandonment of the San Juan, from whatever causes, wrought sufficient dislocation to tip the balance against the dominance of any incipient theocracy. The development of such a group, particularly in an agricultural economy, must pass through (or else always remain in) a precarious stage of existence, when smaller numbers of the general population must support the growing class of specialists in ritual and religious observance. Until severe forms of control can be exercised, this development is in danger from even a short series of crop failures. In the arid Anasazi province this would have been an ever-present hazard to its development.

In the Chaco Canyon vicinity, in the area immediately east of the Chaco, and in a long strip of country lying west of the Rio Grande (Mera, 1935: map 3), there are numerous sites, often in defensive locations, which contain Mesa Verde pottery and trade wares of relatively late type. In the area immediately east of the Chaco, again, are small villages whose pottery is primarily late classic Chaco and the Chaco variety of McElmo Black-on-white. They do not contain Mesa Verde pottery and definitely did not, in my opinion, develop into the late Mesa Verde sites in the same area. I assume that both classes of sites represent movement out of the Chaco and Mesa Verde homelands. If this is true they offer an informative picture of conditions prevailing during the break-up of the major centers. The villages are small, pueblos of 10 to 20 rooms, and widely separated from each other. House rooms are small and surface indications suggest one or two small kivas to each group. The assemblage with which I am most familiar, the Chaco and the area immediately to the east on the Chacra Mesa, lacks the architectural embellishments of the classic homeland sites. The only exception is the tripped-walled building on the Chacra Mesa, a building which housed an entire community and which was possibly the last attempt by this scattered population to preserve the larger ceremonial way of life.

The incipient class structure which has been suggested here is not in evidence in these migrant sites. That it was shat-

tered beyond recovery (if indeed it ever existed) is indicated by the fact that nowhere afterward, particularly in the Rio Grande, the assumed home of the migrants, did there appear the elaboration of such structures devoted to ritual: No great kivas, no multi-walled structures enclosing kivas, and no extra-pueblo structures devoted to and supported by more than a single village.

If there is any significance in the circular multi-walled buildings, it is that they demonstrate the apogee of one phase

of Pueblo ceremonialism. Whether this was the result of purely local development or the product of Meso-American influence acting as a catalyst upon local tradition, the end results were the same. The aberrant form, symptomatic of a whole range of structures and activities with their implied social structuring, did not survive the abandonment of the San Juan area. When the migrants regrouped during the Rio Grande "revival," the exuberance of Pueblo ceremonialism took new forms.

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